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SOME FACTS IN CONNECTION WITH THE OCCURRENCE OF DIPHTHERIA IN DOGS AND HORSES.

BY W. ROBERTSON, M.R.C.V.S., KELSO.

WHETHER that considerable class of diseases to which Diphtheria belongs, are in every instance of their appearance to be regarded as originating from the reception and development in those diseased of the germs of a particular malady—it matters not whether this fructifying element be specific organisms, which by the inherent virtue of their constitution originate this particular diseased action, or are merely the bearers of the more inappreciable and occult agent, the specific contagion; or whether we ought rather to view those diseased actions as the result or evidence of the operation of many and varying influences, acting in very different manners it may be, and through very different channels, on the animal body, are questions which probably at the present time it is not possible to determine in such a manner as to be perfectly free from objection. The whole question of the pathology of the process of infection, and the mode of origin of the acute specific diseases, seem more likely to be advanced by careful and accurate collection and registration of facts, than by any discussion respecting the feasibility of the

truth of the universal operation of any particular theory as to their origin.

We are all apt to be enamoured with neatly constructed hypotheses of disease, and too ready to adopt hastily drawn conclusions; by the latter course of action we save ourselves trouble, while the ready adoption of the former is frequently owing to its coinciding with some individual and preconceived notion, and is in every case an easy method of explaining otherwise inexplicable phenomena.

Inquirers in the domain of pathology are rather disposed to forget that it is less a science of deduction than of induction, and that in medicine there are no first principles from which we may reason downwards to facts, as in some other departments of science.

It is from a conviction of the truth of these things,—the importance, or rather the necessity, of obtaining facts in the investigation of any pathological inquiry, rather than from an assurance of possessing any information unknown to others regarding the etiology of Diphtheria, its nature, or its relations to some other analogous affections, that induces me to place on record some facts connected with its appearance, spread, and subsidence, as these presented themselves in two particular outbreaks,—one amongst horses, the other amongst dogs. The employment of the term Diphtheria is here restricted to that specific sore throat ordinarily regarded as contagious, accompanied with much systemic disturbance, and tending to laryngeal Croup.

In both the outbreaks to be mentioned, the fatality was great; amongst the horses all the affected animals—five in number—dying; in the case of the dogs, there were three or four recoveries from between twenty and thirty seizures. In the greater number of both cases of these animals, although the local symptoms were severe and sufficiently diagnostic, the constitutional disturbance, fever, and prostration were certainly more marked.

As seen in the horses, the seizure was in every instance sudden: the animals, farm horses in good working condition, of different ages, apparently in the enjoyment of the fullest amount of health and vigour one day, were on the following found un-

accountably ill; two, indeed, were only noticed unwell in the evening, having worked all day and fed with their usual zest, both in the morning and at mid-day. Attention was first directed to the animals from their inability or disinclination to drink when offered water; some pushed their noses into the trough or pail, and seemed attempting to swallow, but at once desisted, or the water returned by the nose. The breathing was at the same time noticed to be rather faster than natural, and the nose slightly pushed forward; occasional muscular tremors at this time showed themselves, and the animals were rather restless or uneasy. There was little or no cough, and when it did exist, it seemed merely to result from attempts made to swallow. The glands of the throat were slightly swollen from the first, but certainly did not increase much during the period the animals lived. The temperature rose rapidly, and continued high until shortly before death; while the pulse was accelerated about one half, but was considerably less in volume and force. In one case there were well-marked symptoms of abdominal pain from the outset of the disease, with no abdominal organic lesion observable after death to account for these. In this instance there was also very noisy breathing; this, however, was accounted for at the *post-mortem* examination, which showed more extensive involvement of the larynx and trachea than any of the others. None of these animals lived over the fifth day, and two of them died within forty-eight hours.

The structural changes met with in all these cases were confined to the upper air-passages, only one extending into and beyond the larynx. The membrane covering the fauces, pharynx, tonsilitic cavities, and the posterior surface of the velum, was tense and glistening from the infiltration of the submucous tissue, was much heightened in colour, in some parts of a chocolate hue, and covered throughout with a tenacious and adherent mucus; while in patches, some larger than others, this tenacious mucus was replaced by, or seemed converted into, a more or less distinct film of a greyish colour; these spots or patches seemed disposed to run into each other, as well as to have originated from independent centres. They were not, even in the same individual, of the same texture or consistency:

at some patches the granular or grumous material could hardly be spoken of as membranous, and was easily removed by simply scraping with the back of a knife; at other spots it could be torn off or lifted entire by pulling with a pair of forceps, its tenacity in these cases being considerable. In no instance was this exudation, either when distinctly membranous or only jelly-like and granular, very extensive: that is, passing in a continuous line or band around the cavity. The submucous tissue was much thickened from infiltration, wherever it was heightened in colour. The glandular structures in the region of the throat were slightly enlarged, more vascular, and softer than in health; with, however, no effusion or infiltration in their surrounding areolar tissue. The condition of the urine was not ascertained. The amount of fibrin in the cavities of the heart and large blood-vessels was more than is usually met with. On very careful inquiry, no satisfactory explanation could be given relative to the conveyance of the disease to these animals by means of contagion. There had been no changes, nor had any of the horses, as far as was known, been in company with animals similarly affected, or stabled where such were known to have been. They were themselves in very good working condition, and had shown no premonitory symptoms of illness. The sanitary condition of the stable was certainly not satisfactory, being deficient in light, imperfectly drained, or rather not at all; while the only ventilation afforded was by the door when open, and by means of sliding panels in two windows; added to which there was, within twenty yards, and on ground somewhat higher than the stable, a small pond of stagnant water. This water, it was evident, was percolating through the soil, thus tending to increase the dampness of a stable undrained and situated in rather a retentive clay. Failing to discover other and more easily appreciable causes of this malignant disease, suspicion naturally and of necessity fell upon this unwholesome condition of the stable.

The animals were removed, the stable was altered so as to permit of a supply of fresh air independently of an open door, more light was admitted, a drain was cut both inside the stable and outside the wall, beyond which was the pond, while the pond itself was at the same time removed by a similar process.

No fresh cases occurred amongst the horses after their removal from the stable. Following these alterations the stable was again occupied by the animals which had escaped the disease, together with others purchased to replace the loss, and since then no fresh cases of a similar nature have occurred there.

In the outbreak of Diphtheria amongst the dogs, a certain amount of variation or modification as respects the phenomena exhibited during the course of the development of the disease was observed in several of the individuals.

The dogs amongst which this outbreak occurred formed part of a kennel of high-bred greyhounds. The kennel was in two divisions; the exercise yard of the one division running to within two yards of the door of the dormitory of the other, which had originally been a stable, and where all the cases of the disease occurred. The inmates of this kennel were a mixed lot as regarded age; one half were puppies about twelve months old, the other half consisted in greater part of dogs between eighteen and twenty-four months, with a few aged animals. There had been no importation of animals for some time, and no illness, not even Distemper, amongst the residents. The disease first made its appearance among the puppies, and nearly the whole, if not the whole, of these were dead before any of the others were seized. Many of the puppies had died before alarm was taken, the kennel-man imagining that they were suffering from Distemper; at last suspicion was aroused, and, as usual when any considerable mortality occurs amongst animals, which is rather puzzling to those engaged in their management, poison administered maliciously, or obtained accidentally, was credited with the mortality. An analysis, however, of the viscera of two animals negatived this idea. The average duration of the disease in those fatal cases was a little over two days; many died earlier, and none survived beyond the fourth day.

With the exception of the glands of the throat and cervical region, the structural alterations observable in all cases may be said to have been confined to the fauces and the air passages anterior to the glottis. The urine, in all the instances where this secretion was examined, was opaque, increased in density, and charged with albumen.

In some cases, from the outset, the fever was high, the local inflammatory action markedly acute, the mucous membrane over the fauces, tonsils, and palate became of a dark-red colour, tense, smooth, and glistening in appearance, apparently from distention from infiltration of the submucous tissue. In these, also, the whole gland structures of the mouth and throat were more or less swollen and tender, with deglutition from the first extremely difficult or altogether impossible. The earliest stages were marked by exaltation of temperature, accelerated pulse and respirations, together with slight restlessness, if not actually giving evidence of pain; very shortly, however, these signs of increased functional activity disappeared, there was marked depression, listlessness, and want of muscular energy; Emesis and Diarrhœa might also be present.

The majority of the cases were of this type, and they were also those which succumbed the quickest, death in them seeming to result as much from the extension of the local diseased action into the larynx as from the virulence of the septikæmia.

Post-mortem examination of these cases showed, that only when the animals had survived more than twenty-four hours, was there observable anything in the form of the peculiar and characteristic grey coagulated exudation: this being sometimes in spots, and at others in considerable stripes, but always adherent to the mucous membrane. More frequently the exudation, which was always present, was a glossy, tenacious, soft, structureless, or granular material, more thickly deposited on some parts than others.

Another form or type in which the disease manifested itself was that where the febrile disturbance seemed scarcely so severe, the extension of the local diseased action less rapid, and the power of swallowing never entirely gone; but where the glands of the throat and cervical region were early swollen, and increased in size rapidly, together with extensive infiltration of the connective tissue in which these gland structures are imbedded. In such, there was from the first marked stiffness of the neck, and greater restlessness until coma supervened.

A third class, again, exhibited what may most fitly be termed the "nasal type." After a certain amount of dullness, and fever

of a lower character than was met with in either of the other forms mentioned, there would appear evident sore throat, with a discharge of a sanious material from the nostrils. On examining the mouth, material of a similar nature, but more watery from mingling with the saliva, might be seen bubbling over the tongue from the fauces. Cases of this form survived longest, and in them only did we find sordes on the teeth and lips, the breath becoming fœtid and the lymphatic glands much swollen. The after-death examination of these showed that the disease had extended—whether from continuity or separate centres was impossible to say—into the posterior nasal channels. The infiltration, however, of the submucous tissue, and exudate in connection with the membrane, was always most distinctive in the pharynx and at the pillars of the soft palate. Of the few affected animals which survived, one while recovering became blind of both eyes, with at first no appreciable structural alteration of the organs, although in a few days the cornea of both became opaque, apparently from infiltration of the intimate structures of the membrane; ultimately sight was restored.

Another, about a fortnight after the obvious symptoms of the disease had disappeared, became affected with clonic spasms, or twitchings of the muscles of the face and cervical region, followed in a few days by paraplegia; after a tedious convalescence, this animal also regained full nervous power.

Being satisfied regarding the nature of the disease, we counselled the removal of all those dogs housed in the kennel as yet uncontaminated, and the shifting of such as were still to appearance healthy from the kennel where the disease had arisen to this one vacated by the unaffected. Immediately following this the drains of the place were ordered to be examined, as the sanitary condition was the opposite of satisfactory; on being laid open, these were found all but completely choked with filth, the more fluid portions of the sewage having for some time been percolating into the soil beneath the flooring of the kennel, rather than discharged in the natural or proper manner.

The principal drain, I may mention, had a communication with the dormitory portion of the kennel by means of an ordinary perforated grating. This kennel had no communication by

means of its drains with the other, which, as already mentioned, was in close proximity, and where the dogs continued healthy.

The dogs removed from the uncontaminated kennel were placed in a stable a mile distant, and continued healthy. Amongst those taken from the kennel where the disease originated, and located in the other, three fresh cases occurred after their removal, one of which died.

After removing the flooring, and opening the drains, it was deemed advisable, considering the condition of the walls of the house, not to repair it, but to build another on a different site. After a considerable time, both the new kennel and the one which remained, and into which the dogs from the old one had been removed, were again occupied, and with no bad results, the disease having ceased a few days after the kennel where it first appeared had been vacated.

I have purposely refrained from commenting upon, or drawing any conclusions from these facts, or attempting to enter upon the question of the etiology of Diphtheria: whether we are in all cases to regard it as the result of the reception into the animal body of contagium, living, particulate, and specific—a true "*mycosis*"—or in many cases to revert to our knowledge of chemistry and chemical laws for an explanation of the different phenomena. Circumstances which have occurred, and conditions which have been observed, have been stated, in the hope that possibly some inquirer in this particular path of research may find these facts, when collated with others, helpful in shedding a light over what at the present, in some of its aspects, is rather obscure.

THE TRANSMISSIBILITY OF DIPHTHERIA FROM MAN TO THE LOWER ANIMALS.

Of the existence of Croup and Diphtheria in animals, there can be no doubt whatever. "Simple membranous croup" is not at all unfrequent; young creatures are more disposed to be attacked by it than those which are old, and it affects all the domesticated animals, though the dog is more exempt from it than cattle or pigs. Highly-bred animals of the last-named species are very

liable to it, and in them the disease most closely resembles the human *Angine couenneuse* or *pseudo-membraneuse* of the French medical authorities. It has been witnessed in an epizoötic form in cats, and it frequently prevails as an enzoöty among poultry. The false membranes may be limited to the larynx, or they may extend to the pharynx, mouth and nasal fossæ in one direction, and the trachea and bronchi in the other.

Diphtheria is certainly rare in animals, and has not yet been alluded to by veterinary writers in this country, we believe. It nevertheless exists, and sometimes in a very marked form, differing from Croupal Angina by the great prostration which accompanies the formation of the diphtheritic exudations, and the tendency to a fatal termination. In addition, we observe a disposition to the production of plastic deposits wherever an artificial inflammation has been attempted to be set up. Blisters, for instance, instead of being followed by vesication or suppuration, are frequently succeeded by a more or less thick layer of fibro-albuminous matter. Setons are also often sheathed in a pseudo-membranous cylinder. The blood is very plastic at the commencement of the disease, and its clot is thick and very firm.

Diphtheritic exudations in the larynx and bronchi are somewhat common in Cattle-plague, Contagious Pleuro-pneumonia, and some other maladies of animals.

We have no strong proof that Croup or Diphtheria is contagious in animals, except the first-named disease, which is so in poultry.

The relations of Diphtheria in animals to the same disease in mankind have only been recently definitely established; while the transmission of the malady from one species to another has been satisfactorily demonstrated. There are certainly no proofs that any relationship exists between the malady termed "Distemper" in the dog and Diphtheria, though on occasions they may have prevailed coincidently in a district. Thus, in 1851 or 1852, a severe outbreak of the latter disease occurred in Tasmania, which swept off two or three members in every family; at the same time, according to the report of the Australian Royal Commission on Diphtheria, all the dogs died of Distemper. There may have

been some morbid influence at work which favoured the genesis and extension, while it added to the virulency, of both scourges; but beyond this we cannot at present go; for if we remember aright, dogs perished about the same time in great numbers from Distemper in New Zealand and Australia—even the *Dingoes*, or native wild dogs, being found dead in multitudes in the scrub; and yet we cannot ascertain that Diphtheria was at all prevalent, or even present, in these countries at that period.

To our knowledge, there is only one instance of a case in which accidental transmission of the disease from man to an inferior animal appears likely to have occurred, and this is alluded to by Dr. Sir J. Rose Cormack, in the *Lancet* for April 24th of the present year. It is related by Professor Bossi in the "Giornale di Medicina Veterinaria Pratica d'Agricoltura," and is to the following effect: A friend who had lost a child by Diphtheria, after a few days' illness, requested me to visit a very beautiful small-breed greyhound, about one year old, which had become unwell a few days after swallowing some of the child's excreta, and some remains of food which had been served to him. On making a careful examination of the dog, Bossi found it in a state of great prostration: languid look, lachrymant eyes, and open mouth copiously discharging a viscid fluid; quick, sibilant breathing; hoarse voice; full, hard, rapid pulse; the neck so stretched as to be almost rigid; and difficulty in deglutition. By digital examination, the throat was discovered to be œdematous, and the seat of severe pain. On opening the mouth—a difficult operation—the mucous membrane of the fauces was seen to be red and swollen, and two ulcers were on the veil of the palate and right tonsil; that on the latter was of some size and depth, and had an elevated border. The symptoms and appearances in this case led Bossi to conclude that the animal was suffering from Diphtheria, or perhaps more correctly speaking, from laryngo-pharyngeal Angina of pseudo-membranous or croupal character. The dog died on the third day, from suffocation, after having had some convulsive movements. At the necropsy, the mucous membrane of the fauces was found in a pulpy condition and denuded of epithelium. Here and there, the membranous exudation presented the appearance of compact,

thick, adherent excrescences. The ulcerations were blackish and very deep. The inflammation extended to the mucous membrane of the pharynx and larynx. The heart and lungs, which presented a blackish, flabby appearance, contained pitch-like blood and several fibro-albuminous concretions.

This is a remarkable case, and one well worth remembering by members of the veterinary profession, many of whom have a good deal of practice among dogs: animals which, from their intimate association with mankind, and from their habits and tastes, would be the most likely to receive the contagion, if it be really transmissible.

Experimental evidence as to the transmissibility of Diphtheria from man to animals is not very abundant, but it appears to be sufficiently clear to enable careful pathologists to come to a decision; as several have concluded, from the results of their attempts to produce the disease in animals, that the morbid process generated in these by inoculating portions of diphtheritic concretion is not simply what has been designated a "mycosis," but is, in reality, the specific malady itself. In his report on the "Pathology of the Infective Processes," just published in that of the Medical Officer of the Privy Council, Dr. Burdon Sanderson gives a *resumé* of the experiments made by the principal of these pathologists.

Of these observers, Dr. Sanderson points out that Dr. Letzerich,* of Braunfels (Nassau), and Dr. Oertel, † of Munich, are the most important. The former is the author of several papers on Diphtheria, the titles of which are given in a note. These papers contain various observations relating to Diphtheria as it presents itself clinically, and serve to illustrate the intimate association of the development of microzymes in the affected parts with the morbid process; the author also records numerous experiments showing that when the disease is communicated by inoculation, its characteristics re-appear in the infected animal, even those

* *Letzerich*, Beiträge zur Kenntniss der Diphtheritis. Virchow's Archiv, vols. xlv., p. 327; xlvi., p. 229; xlvii., p. 516. Monographie der Diphtherie, Berlin, 1872. Die Entwickelung des Diphtheriepilzes, Virchow's Archiv, vol. lviii., p. 303 (1873).

† *Oertel*, Experimentelle Untersuchungen über Diphtherie; Deutsches Archiv für Klin. Med., vol. viii., pp. 242-354.

which belong to its more remote complications. Dr. Letzerich's facts lose much of their value, according to Sanderson, from their not being set down with that simplicity which ought to characterize all scientific writings. His papers, moreover, contain a great deal of questionable mycology, in which the patient reader is apt to lose himself in his search after objective facts.

The *mémoire* of Dr. Oertel, published three years ago, also embodies anatomical and experimental investigations relating to the effect of inoculating animals with material derived from the larynx in cases of diphtheritic Laryngitis in children. Like Letzerich, the author found that a disease having well-defined pathological characteristics, and in particular associated with Nephritis, could be produced by such inoculation; and further, that it could be communicated from one animal to another without losing any of its distinctive features. He further showed that the disease in question, whatever were the local peculiarities given to it by the tissue in which it was ingrafted, was always a mycosis; in other words, that all the "localizations" of the disease were associated with the presence in the affected part of innumerable microzymes. As regards the agents of infection, he concluded that their presence was the only constant characteristic of the contagion, for he found that the disease could be produced by the transference to the tissues of a healthy animal of even the smallest fragment of any diseased tissue, and that all diseased tissues contained microzymes in greater or less numbers. The following short account of a series of experiments, in which the disease was transmitted through five successions of animals, will enable the reader to form an estimate of the bearing and significance of the research.

The material for the first inoculation was removed, about twelve hours after death, from the trachea of a child, aged five, affected with laryngeal Diphtheria. It consisted of the usual cellular elements embedded in a fibrinous stratum, which was infiltrated with innumerable micrococci. Of this, three fragments as large as pinheads were introduced into the trachea of a rabbit, which died about thirty-six hours afterwards with the characteristic signs of Croup, and exhibited in the air passages and in other organs the pathological appearances to be immediately described.

With the tracheal concretions of this animal a second rabbit was inoculated, and from that a third. The latter in its turn afforded material for the inoculation of two pigeons, of which each served as a source of contagion for two rabbits. Of these two pairs of rabbits, one pair were inoculated subcutaneously, the other two being infected by the injection of the virulent material in minute quantity into the larynx. In all, the results were similar, the pathological changes and symptoms being quite as characteristic in the last of the series as in the first. The following description is that of a rabbit which received the disease in the air-passages, after four previous transmissions, the immediate source of infection being a pigeon.

The animal had died ninety-six hours after inoculation, the symptoms of laryngeal affection having lasted longer than usual. The tracheotomy wound had completely united, but underneath it there was a cavity lined with greyish material of pulpy consistence; the subcutaneous tissue of the whole body, excepting that of the back and neck, was infiltrated with sero-sanguinolent serum; and the subcutaneous lymphatic glands were enlarged and hyperæmic. From the vocal cords downwards to the middle of the trachea, a tubular, whitish, tolerably adherent membrane, of about $\frac{3}{5}''$ in length and $\frac{1}{12}''$ in thickness, covered the mucous membrane. This membrane was continuous by a narrow neck with a second membranous concretion, which extended over a great part of the larynx and the lower half of the epiglottis. In the kidneys, the epithelium of the convoluted tubes was swollen and granular, and in many instances detached. Masses of micrococci occupied the spaces between the glomeruli and their capsules, and were also distinguishable in the tubes. Capillary hæmorrhages presented themselves in great numbers in the intertubular tissue, and many of the tubes were choked with blood-corpuscles. The muscular tissue—especially in the neighbourhood of the trachea—exhibited, in addition to germination of the interfascicular tissue, peculiar changes, which the author has examined with great care. He finds that in all infected animals the contents of the muscle-tubes look as if they had shrunk from the sarcolemma, and in doing so had split transversely into cylindrical fragments, between which the

empty tubular sheath can often be distinguished. In the blood, micrococci and bacteria existed in enormous numbers. They were also present in the enlarged lymphatic glands, and indeed in all the affected tissues.

The reader will observe that in the series of inoculations of which a summary has been given, several links in the chain of transmissions of the diphtheritic affection from animal to animal consist of subcutaneous inoculations. In the animals so infected, the changes in the blood and tissues which may be regarded as the signs of infection, were not distinguishable from those observed when diphtheritic material was injected into the air passages, the only difference being that there was no Laryngitis. In commenting on these experiments, the author says: "The pathological process which results from the introduction of diphtheritic material under the skin or into the tissue, must be regarded as a truly specific one, excited by a contagium identical with that which is present in the concretions on the surface of mucous membranes. *No such process can be induced in the animal organism by any putrescent or decomposing material.* The general infection produced in the animal body by diphtheritic inoculation extends centrifugally, from the seat of inoculation through the tissues, and shows no preference for any one organ in particular; the participation of the kidneys, for example, being merely a result of the existence of the infecting material in the circulating blood."

Here all turns on the statement which Dr. Sanderson has printed in italics. To prove this, Oretel's experiments are insufficient. For the present, in the opinion of Sanderson, the question whether or not the induced diphtheritic affection of rabbits is excited by a contagium identical with that of Diphtheria, must remain open.

But since that opinion was given, additional evidence as to the transmissibility of the malady has been produced.

In Virchow's *Archiv* for April of the present year (p. 178), Letzerich relates an interesting case, in which Diphtheria was transmitted to a child through the medium of vaccine lymph; and he also gives the details of an important test experiment, in which a dog was inoculated with vaccine matter that

had been mixed with a small proportion of matter from a diphtheritic mass removed from the tonsils of a child that had died of the disease; this was supposed to contain the active organisms of the affection (*Diphtherieorganisms*). This dog was inoculated on the left side of the body, near the spine, by eleven points, and three punctures, and four wounds. On the third day a soft swelling was observed, and the skin was red and hot; the wounds were gaping, indurated, and covered with a whitish, doughy-looking exudate. The swelling, it may be mentioned, continued until the dog died. The inoculation points were also somewhat gaping, and in the same condition as the wounds and punctures. From the third day the dog lost its appetite, and there was noted an important and considerable periodical increase of temperature. From the seventh day it would eat nothing; the pulse was small and exceedingly quick, and the respiration hurried; the animal lay on its side, and in this condition died.

On an examination of the body, it was discovered that in the swollen, boggy part of the skin where the inoculations had been made, there was fibrinous infiltration of the subcutaneous connective tissue, with hæmorrhagic patches of a bluish-black or dirty light-red colour, that passed deep into the muscles of the back. In the abdominal muscles attached to the spine, as well as in the peritoneum, there were also a few isolated patches, generally running into each other in an irregular manner. In the connective tissue of this region were many marked hæmorrhagic patches, and they were all related more or less to others in the connective tissue surrounding the left kidney. This organ exhibited on the infero-external portion, which was in contact with the lumbar region, a circular, eroded, hæmorrhagic spot, about the size of a rather large pea. The liver was reddish-brown in colour, and very much enlarged and indurated. The spleen was also enlarged, very full of blood, and its parenchyma softened. The heart was softened, and its texture very light-coloured. The lungs were healthy, but the stomach and intestines were somewhat swollen; the stomach was empty, and the small intestines nearly so; the large intestines contained a quantity of fluid fæces, but no scybala. The right lumbar region was normal, and

the right kidney large and light-coloured. The bladder contained a small quantity of muddy urine.

A colleague of Dr. Letzerich made a most careful and interesting histological examination of the body, and found at the seat of inoculation, in the wedge-shaped exudate formed at the punctures and wounds, bacteria and plasma-globules (*plasma-kugeln*) closely agglomerated, the latter being in a finely granular condition. In a prepared section of the skin, it was noted that the sheaths of the hair in various parts were full of bacteria, micrococci vesicles, and plasma-globules. In the texture of the skin itself were numerous masses of bacteria, and plasma-globules, as well as clusters of micrococci. In the vicinity of those muscles which were stained by hæmorrhagic patches, the capillaries were distended, and contained the same abnormal elements; these were also seen in the connective tissue of these parts, as well as between the nerve bundles and muscular fibres. In the interior of the capillaries of the hæmorrhagic patches themselves, between the masses of red blood-globules, were immense colonies of micrococci; the same condition was observed in the peritoneum and its connective tissue. The muscular fibrillæ were scarcely distinguishable in these patches, and their meshes were enormously distended by escaped red blood-globules and an extraordinary number of colonies of micrococci, with an exuberance of plasma globules.

In the round hæmorrhagic spot on the left kidney, and for some depth in its substance, were masses of red blood-globules and clustering rows of wandering micrococci. All the tubules of the gland were filled with exudate, in which bacteria and plasma globules were seen in great quantities. In the right kidney the migratory vegetable organisms (*wanderung pilzen*) were observed to be in their first stage of development. Not a part of the liver that was examined but contained these retrograde vegetable formations; all the cells were filled with them. Between the fibres of the heart were only discovered layers of plasma-globules and bacteria; but many of the smaller veins were filled with colonies of micrococci which adhered to their walls. The spleen was in the same condition as the liver; indeed, the reporter states that it was only an emulsion of cells, cell *débris* (*trümmern*),

nuclei, bacteria, small micrococci, and a diversity of large plasma globules. The pulmonary blood-vessels contained the characteristic Diphtheria organisms (*diphtheriepilzes*); in one portion of the parenchyma of the lungs was found a small micrococci ecchymosis.

All these alterations are well illustrated by coloured drawings.

From the case of accidental transmission of Diphtheria through vaccination, and this experimental conveyance of the malady to a dog, Letzerich draws the following conclusions: 1. Vaccine matter which has passed through a diphtheritic subject, and become tainted, will not produce a vaccine pustule at the place where it is inserted; 2. That lymph so tainted, when introduced by inoculation, speedily gives rise to general Diphtheria. From the obvious results of the experimental case in particular, it may be concluded: 1. That inoculation with lymph which has not been tainted with diphtheritic organisms will, in a given time and in a normal manner, give rise to the well-known pustules; and, 2, on the contrary, that the local Diphtheria of an inoculation wound is followed by general Diphtheria as a secondary process.

Whether the Diphtheria of the lower animals is inter-transmissible, or whether it may be communicable to the human species, we have no evidence to base even a supposition upon; but there can scarcely be any reason for hesitation in accepting the fact that another malady is added to the list of those which are at least capable of being conveyed from man to creatures lower in the scale of creation. This new addition furnishes another proof of the value of comparative pathology, and the close relations which exist between animal and human medicine.

HYPERTROPHY AND GENERAL DISEASE OF THE HEART IN A HORSE.

BY J. W. HILL, M.R.C.V.S., WOLVERHAMPTON.

ON the 14th of June we lost a valuable mare under the following circumstances.

I drove her in a light gig a distance of twenty-four miles,

starting at 11.30 a.m. and reaching home a little before 8 p.m. Seven miles from town I had to remain with a case for two hours, and again, six miles further, I was delayed for the same time, in consultation cases with another veterinary surgeon, and also at three other places on the way back, within three miles of the journey's end, varying from five minutes to a quarter of an hour. My reason for mentioning the time and stoppages will presently be perceived. The mare was "fresh," and did the journey well till within a mile of home, when she pulled up, seemingly wearied. I may mention she was a remarkably fast animal, and exceedingly sensitive to whip or noise; so when I urged her I was surprised she did not respond as usual. I then got out of the carriage and led her to within a few hundred yards of our premises, when she appeared so thoroughly exhausted that I drew her into an hotel yard, and sent a groom to fetch her, *minus* the gig. He, however, brought both, and she came into the infirmary stronger and comparatively cheerful. A quart of slightly warmed old ale, with a little ginger in it, was immediately administered; I then had her well rubbed and clothed, the weather being too cold and dry to wash her, and she remained quiet and seemed comfortable; but in less than ten minutes she suddenly pitched forward into a corner of the box, with her head between her fore-legs, the hind limbs retaining their position. She was lifted by the grooms and our assistant, Mr. Brock, and supported by them. I found her nearly pulseless, trembling violently, legs set back, spasmodic twitchings of the mouth and ears, the *membrana nictitans* protruding entirely over both eyes, body and extremities deathly cold, and a cold perspiration pouring off her. We gave her all the air possible, and applied ammonia to her nostrils, which for the time revived her. The previous symptoms ceased, and the skin became hot; but in a few moments she died without a struggle.

A *post-mortem* examination three-quarters of an hour afterwards gave the following results. The lungs (with the exception of a little consolidation at the edges of the lobes, and slight thickening of the *Pleura pulmonalis* in small patches, the result of a severe attack of pneumonia some four years previously) perfectly healthy, both in colour and texture, and without the

slightest congestion, or approach to it. I may here observe there was no "blowing" from first to last, but simply a dead weariness, if I may so express it, that came on as rapidly as it was remarkable. The heart, which I suspected to be the cause, was extensively diseased: it was hypertrophied, with great fatty deposit externally. On opening it I found the valves on both sides, at the auriculo-ventricular openings, considerably thickened towards the edges, with a gritty deposit therein; on the right side the valve had, in addition to the thickening, a glandular earthy body, resembling tubercule, the size of a horse-bean, on its outer side. On opening the left ventricle, there was presented to view a solid, glistening, blue-looking body on the wall, the size of a small egg. Making an incision into it with the knife, I found it contained a clot of blood partially organised; while below it, nearer the apex, was another with a recent and more diffused clot. To these two unusual deposits I attribute the mare's sudden death; the bulging out of the tumour underneath the *chordæ tendinæ*, interfering with their function and confining the valve. The liver capsule was adherent, but in other respects healthy. The stomach was congested: the effect, I opine, of the warm ale and ginger. The remaining viscera were healthy.

In conclusion, and with regard to the cause of the mare's illness, it may be thought she was over-driven; but to show that her powers of endurance, as might have been expected of an animal in regular work and muscular condition, were not overstrained, I have mentioned the time she had for the journey and the various stoppages. Again, that such could not be the case was plainly shown by the condition of the lungs, together with her exhibiting no signs of fatigue or distress until, suddenly, within a mile of home, at which time she was barely going at the rate of seven miles an hour. Neither was it from fasting, as she had been fed at two places. What then, it may be asked, caused death? It was a stormy day, and several times both of us were thoroughly drenched. I am inclined, therefore, to think, that being taken out of the shafts warm and wet, and probably placed in a draught (as a gig was waiting to take me to another part of the estate, and I did not see where or how she was

stabled), the subsequent chills may have had something to do with it. I think the case an interesting one, and have pleasure in forwarding it for insertion in our new journal.

P.S.—The subject was an aged grey mare fourteen hands and a half high.

(Since receiving the above interesting communication, Mr. Hill has sent us the following notes of a similar case, with *Hpdrops pericardii* superadded to the heart disease, and ulceration of the *Septum nasi.*)

HEART DISEASE AND HYDROPS PERICARDII.

I SEND you to-day, 3rd July, *per train*, the heart and pericardium of a brown waggon horse that died this morning, belonging to Mr. W. Allen, of Benthall, Broseley. I preserved the former in its entirety, that you might have a better chance of examining it. You will perceive that there is considerable hypertrophy, together with valvular disease; also the same calcareous deposit on the valves at the auriculo-ventricular openings found in the previous case of our own mare. The heart, without its sac, weighed thirteen pounds; with its covering and the blood it contained, eighteen pounds. Within the pericardium was more than a quart of dense yellow fluid, of the same colour as the detached portions of that membrane I have sent, and which you will notice are considerably thickened,—in some parts to the extent of half-an-inch, and presents a jelly-like appearance, due to effusion of serum between the layers.

The animal was purchased by Mr. Allen four years ago, and was then four years old; it continued to work more or less up to the early part of the present year, when, in the second week in January, it took a load of ware some distance, and from that date, I am told, it gradually wasted. On the 8th of May, we were requested to see it (it had then been in the hands of an unqualified man for some time); in our absence, our assistant attended it, and diagnosed the case as one of heart disease; he applied a blister to the left side, and administered tonics. On

the 21st inst., I visited the patient, and found it very low in condition; the pulse was intermittent; the beating of the heart could be heard some yards distant, and auscultation gave to the ear a peculiar double thumping sound; the visible mucous membranes were pallid.

Mr. Allen told me the horse had been at various times apparently lame, first in one limb, then in another, fore and hind, as if affected with Rheumatism. I gave it as my opinion that the animal was suffering from Hydrops pericardii, probably as a result of Rheumatism. I ordered another active blister to be applied to the left side of the chest, and put the horse under a course of iron and diffusible stimulants; but after a time I received a letter informing me that there was no improvement; and on the same day, the 18th, our assistant, owing to my inability to attend, saw it, when, being in fact worse, Mr. Allen decided to let it take its chance without further treatment, and with the result already named. He informed me, after making the *post-mortem* examination, that since my last visit a discharge of blood and matter had been observed to pass from the near nostril; this continued a fortnight, and then ceased. On opening the nostril with a knife, I found, some distance up, the septum nearly perforated by ulceration, with several smaller ulcers around; the opposite nostril was reddened at that part, but the surface was unbroken. There was no enlargement of the glands or lymphatics, and the lungs were perfectly healthy in every respect; the animal had never coughed. Would it be possible for this condition of cartilage to arise from Rheumatism or Debility? or was it Glanders? The patient was free from anything of the kind when I saw it last alive; and the accompaniments of that disease, beyond the ulcers, were entirely absent in the carcase.

VETERINARY PRACTICE IN INDIA.

BY STAFF VETERINARY SURGEON J. COLLINS, LATE INSPECTING VETERINARY SURGEON, BOMBAY PRESIDENCY.

(*Continued from page* 22.)

THE practitioner in India is often called upon to operate on horses aged twelve, fifteen, and even twenty years. As a rule, the oldest horses suffer the least, and make the best recovery. Those which give the most trouble, and in which the inflammation is most intense, are horses under twelve years old.

Veterinary surgeons have different methods of operating; some prefer the caustic clams, some the ligature, and some the hot iron; while others prefer "scraping." The writer has tried all these, but has always given the preference to the caustic clams. The mortality by this method was under two per cent., the average being taken from close upon a thousand horses, varying from four to twenty years of age; the large majority being between six and twelve.

The advantages of the method with caustic clams are its simplicity, cleanliness, absence of hæmorrhage, and favourable results. These are great advantages under all circumstances, but especially so in India, where, from the scarcity of veterinary surgeons, the operation has to be carried out by native farriers of irregular corps, as also farrier-sergeants of batteries. At the Veterinary School in Poona, the writer found it necessary to perform the operation once only before a large class of these men assembled for instruction; when, in the absence of serious complications, they afterwards proved themselves capable of doing the same satisfactorily.

By this method, the operation is somewhat longer than by "scraping," as it is necessary to remove the clams from twenty-four to forty-eight hours after, and thus complete it. When a large number of horses, ponies, or mules have to be "cut" at once, as was the case during the Crimean, and on the eve of the Abyssinian war, castration by "scraping" is the quickest and readiest method, and is attended with the least trouble, but the after-effects are occasionally not satisfactory.

As an illustration, the writer had on one occasion eighty Cape horses to castrate, all six years old. Seventeen of these were operated upon by "scraping:" one died from tetanus, two bled very profusely, whilst in five or six the hæmorrhage, although not great, did not cease for three or four hours; the others recovered exceedingly well. The remaining sixty-three horses were "cut" with the clams, and they all did well. The whole were operated upon in the same month.

On another occasion he had to operate on nearly three hundred animals expeditiously. All were operated upon by "scraping." Out of this lot eight died: two from tetanus, the others from excessive inflammation or grave complications. In a good many the hæmorrhage was considerable. They were all operated upon in ten days.

First, as to the operation with the CAUSTIC CLAMS. Materials for making the clams are at hand everywhere in India in the native bamboo (see fig. 6); this wood is in every way the lightest, strongest, and most suitable for the purpose. Pieces should be selected about the thickness of a medium-sized ruler, cut into lengths of from six to ten inches, and split in two down the centre. The hollow channel is then filled with the caustic paste; a very excellent one is composed of six drachms of bichloride of mercury (corrosive sublimate) to an ounce of any suitable vehicle: a convenient one is the ordinary composite candle, as it does not so readily melt and run in a hot country, as ordinary tallow or lard would be found to do. One end of the clam should be securely fastened together, previous to the operation, by strong waxed twine, the wood being notched to receive it. The operator should carefully see to this himself, as any slackness in the twine, or an insecure knot, might be the cause of considerable hæmorrhage when the clams are finally removed. One end of the clam should be sloped inwards, so as to admit of its being opened when so tied.

FIG. 6.

It is a good plan in India, when the subject for castration is generally of full age and dry fed, to keep him for three or four days on bran and hay, giving no grain, and administering a dose of physic. He should also fast, and be kept for several hours

without water, previous to the operation. It is well not to castrate during the rainy season; for wounds at that period do not heal readily, and the flies are very troublesome.

It is also of importance, in all cases, to examine the scrotum and testicles *before* the horse is cast, in order to ascertain if there is any appearance of Hernia; also to be informed of their condition. If the horse is aged, and the testicles feel unusually hard and swollen, and the cord thickened, it is probable that adhesions will be found to exist between the scrotum and testicle, and a long strong pair of clams will be required. If a Hernia is present, the covered operation will be necessary. If the testicles are swollen and tender, from acute or subacute inflammation, and the patient's back is arched, and flanks drawn up, it is dangerous to operate at all; for Peritonitis is almost certain to follow.

The practice in England is to cast the colt with a rope only, as it is not easy to fasten the hopples on an unbroken animal. By this method, however, he cannot be thrown on any precise spot; but in a field this is of no moment. In India it is necessary to cast him on a bed prepared for the purpose, circumscribed as to space; and as the horses are broken in, there is no difficulty in applying the hopples. The best plan is a combination of the two, rope and hopple. The rope should be tightly noosed in the centre, then passed over the head, and allowed to hang collar-ways, the ends being left free in the usual way. The horse should be cast on to his off or right side with the hopples. When he is down, pass one shank of the rope outside the fore-leg, round the near hind pastern, and back through the collar-rope; now release the leg from the hopple, draw it well forward, and secure the rope. The other shank of the rope may at pleasure be hitched over the off hind pastern, after the horse has been turned on to his back, and thus make all steady. By this means the hind legs can be well opened out; with the hopples alone this cannot be done.

The writer never in his practice used either a back strap, band, or cross hopple; and of the many hundreds of horses cast in this way, not a single accident of any kind ever occurred, either in the way of broken back, fractured leg, or injury to the assistants.

As stated before, with the majority of horses the operation is simplicity itself. A hinged metal clam is placed on the cord above the testicle, or what answers equally well, the handles of an ordinary smith's tongs. The testicle is now under complete command. If the hand only is trusted to, the cremaster muscle is occasionally of such power that, during the struggles of the animal, the testicle is very likely to slip from the grasp. By a free incision through the scrotum, performed by two or three rapid strokes of a sharp scalpel, the testicle escapes. The caustic clam is now applied above the epididymis, the end already fastened being placed anteriorly; the other end is securely tied with waxed twine, close up to the side of the cord. If the cord is at all thickened, it is better to bring the ends of the clam together with the aid of a clamp or pair of tongs, as the fingers have not sufficient power; for if the compression is irregular or incomplete, hæmorrhage will follow on removing the clam. The other testicle is exposed and secured in the same way, and the horse then allowed to rise.

There are two periods during the operation when the animal struggles; one is at the first stroke of the knife through the skin, the other when the testicle escapes from the scrotum. Strange to say, he rarely struggles or evinces pain when the cord is being grasped and compressed by the clams.

The writer has employed chloroform on many occasions, first casting the horse; but the time occupied in producing complete anæsthesia, together with the violent struggles and evident distress experienced, considerably detracted, on the whole, from its benefits, whilst it did not mitigate the after-sufferings, which are at times considerable. In this respect there is a great difference in horses; some appear totally indifferent to the operation, and will show no subsequent pain; others, again, will lie and roll and perspire and paw for two or three hours; but both are exceptions. As a rule, when the caustic clam is used, he will stamp with his hind-feet occasionally for an hour or so only, and seldom, if ever, refuse food.

A considerable difference will be noticed in the size and development of the genital organs in horses, even of the same age. In this matter the novice should be careful not to be misled, and

attribute it to disease. At times the testicles will be found immensely large, the epididymis hypertrophied, and the cord thick, fleshy, and strong. This condition is often found in old under-bred Persian and Northern horses. But there need be no hesitation in operating; all that is necessary is to employ a stronger pair of clams than usual, and see that they are well secured.

(*To be continued.*)

DISEASE OF THE MAXILLARY SINUSES.

BY THOMAS PATON, M.R.C.V.S., ARMY SERVICE CORPS, DUBLIN.

By way of illustrating the difficulties in successfully treating diseases of the maxillary sinuses, the following account may interest some of the readers of the *Veterinary Journal.*

On the 15th February, 1875, a mare was brought to my notice suffering from "Ozœna;" she presented a slightly fetid muco-purulent defluxion, which was ejected in flakes at intervals from the left nostril. The precise origin of the case was not clear, but was supposed to be due to recurrence of a catarrh, from which the mare suffered some months previously; there was slight enlargement of the superior cervical and submaxillary glands, but the teeth were sound and regular; the mare did not "quid" her food, nor was there otherwise the slightest deviation from health.

The animal was considered "vicious," and had been subjected to severe, if not cruel, treatment; she was extremely "head-shy," rendering it almost impossible to examine the left side of her face, though perfectly submissive to manipulation of the sound side. This state of affairs led me to suspect damage to the facial bones; and this suspicion was confirmed by dulness and tenderness on percussion of the malar ridge and corresponding maxillary sinus, with slight fulness of the superficial facial veins. This extreme unwillingness to submit to examination of one side of the face should always be looked upon as an evidence of pain, and cause us to make a careful scrutiny before excluding any of the contiguous parts from investigation in establishing our diagnosis.

On trephining the maxillary sinus, so as to open the anterior and posterior main cavities simultaneously, slightly fetid pus was freely evacuated, and the sinus syringed out with tepid water. The two follow-

ing days the syringing was repeated, giving exit to sanguineo-purulent matter; on the next three days, blood-clots, of four, two, and three ounces respectively, were set free by the tepid injections. The discharge by the nostril was intermittent, and regulated by that from the artificial opening: that is to say, when the trephine wound was patent and discharging, the nostril was clear, and *vice-versâ*. Five days after the operation, the sinus was injected daily for thirty-nine days consecutively, with a solution of acid carbol., 1 to 40 of water, with the effect of keeping the discharge inodorous, and diminishing its daily flow; the enlargement of the submaxillary gland varied with the degree of inflammatory action in the vicinity, as evidenced by local heat, facial swelling, and obstruction of the superficial facial veins.

As the case continued unpromising, the mare was destroyed.

The *post-mortem* examination revealed imprisoned collections of caseous matter, probably cellular *débris*, due to inflammation of the mucous membrane, producing cell proliferation, and some fluid pus in the maxillary sinuses; Periostitis, extending throughout the cavities to the frontal sinus and ethmoidal plates, the flutings on whose convex surface were much roughened and almost obliterated by the deposition of new ossific material. In a conchoidal cavity, partly formed by new bony matter, and the floor and outer wall of the left nasal fossa, there was a collection of cheesy matter, similar to that found in the maxillary sinuses. Externally, the inferior portion of the malar spine and the bone below it, forming the outer wall of the dental alveoli, were roughened and porous from Periostitis and the results of the inflammatory process, which, as before mentioned, extended to the sinuses, and had evidently commenced from an external injury sustained by the malar spine. The submaxillary gland contained a little fluid purulent matter. The lungs were perfectly healthy, except a small cretification, which might have been a tubercular granule that had undergone that process.

The teeth were all perfectly sound, and the internal viscera presented no abnormality.

The lesson which this and the like cases teach us, seems to me fraught with interest on account of the various opinions which prevail as to their tractability, difficulty of exact diagnosis, too great frequency, many of them being preventible, and their liability to terminate in Glanders, so called, from the explosion of tubercle in susceptible subjects. The frequent occurrence of chronic nasal discharges from external injuries sustained by the malar ridge, nasal and frontal bones, inducing inflammation of the lining membrane of the sinuses and fossæ, and in some

cases extending to the membranes lining the air-passages, leading to depots of epithelial *débris*, pus, etc., which lay the foundation of tubercular disease of the lungs in subjects hereditarily predisposed, or which have long been depressed by debilitating influences, if not actually producing so-called Glanders in subjects without proclivity, *i.e.*, generating tuberculosis *de novo*. One more thought in connection with these discharges from the left nostril, with sympathetic or concurrent tumefaction of the corresponding submaxillary glands, which occurs to me, is that, besides chance injuries, the malar ridge, which is providentially placed as a protection to important parts against ordinary accidents, fails to ward off the deliberate assaults of horse-breakers, rough-riders (not trainers), and others, who, from infirmity of temper, defective teaching power, etc., are unsuccessful in communicating their wishes to the horse, are betrayed into the violent use of whip-stocks, broom-handles, and other weapons, to compel the obedience they are unable to elicit otherwise; and being accustomed to approach the animal on the near or left side, this may account in some measure for the fact of the frequency of the affections of the left nostril. My friend, Mr. T. D. Lambert, of this city, through whose courtesy I have been enabled to watch several similar cases of late, and who examines many hundreds of horses annually, informs me that he always introduces a saving clause in his certificates of soundness, when he finds recent marks of injury to the malar ridge; as he considers such horses liable to develop disease of the facial bones, which may lead to Glanders, any time within a year from the receipt of injury; in this precaution my experience leads me fully to concur.

To those conversant with the anatomy of the superior maxillary region, no further remark is necessary to remind them of the enormous pain that must result from the pathological changes which the adjacent structures undergo as a result of external violence, particularly when the *canalis infra-orbitarius*, containing the sensory divisions of the fifth and communicating ganglia, is included.

Editorial.

THE ROYAL COLLEGE OF VETERINARY SURGEONS.

FOR many years it has been observed that the Royal College of Veterinary Surgeons, as the Corporation of the Veterinary Profession in this country, was far from being everything that was desirable or necessary in its constitution, or in its influence in keeping our science abreast of the times, and protecting the interests of its members. It is somewhat difficult to discover what were the objects the original promoters of the Charter of Incorporation had in view when they drew up the instrument which received the Royal Sign Manual in 1844; but it is certain that, however laudable and well-intentioned their aims may have been, the result has not proved very beneficial or satisfactory in several respects. Perhaps it may have been looked upon as a great achievement at that period to have obtained the recognition by the State of the Veterinary Profession, and to have had the powers and privileges of a Corporate Body conferred upon it; and that one of these powers was the sole right to examine the students taught at the two schools then in existence—one in London and the other in Edinburgh—and to confer upon them the distinctive designation, if found worthy, of Member of the Royal College of Veterinary Surgeons, and consequently alone entitled to be styled "Veterinary Surgeon." This, no doubt, was something to have achieved, and that it has been productive of a fair amount of good in one or two ways few will be disposed to deny. That the advantages which might have been derived from it have not all been realized, owing to circumstances which are now sufficiently apparent, is no less true; but yet, after all, it must be confessed that the powers and privileges the Charter conferred were totally inadequate to meet the requirements of the profession, even as things existed thirty years ago. And one cannot avoid the conclusion that those who were mainly concerned in obtaining the Charter did not look much beyond their own times, nor did they provide in

any way for contingencies which might easily have been foreseen as certain to occur within a very brief period.

The time has now quite arrived, we believe, when a New Charter must be obtained, in order that the profession may be placed in a position in which to make the most it can of circumstances, and to avail itself of every opportunity that may offer to improve its position and advance its interests in a manner satisfactory to all concerned. The present Charter has outlived itself by many years, and is confessed on every side to be impotent in most essential particulars. Nothing can be done in the way of improvement until a new instrument is obtained: one that will not only meet the demands of now-a-days, but that will be so framed as to anticipate the wants of the future. Serious reforms are urgently necessary in the constitution of our University, which, as a corporation, is about as imperfect as could possibly be. Alterations in the mode and the periods of examining the students, both as to their general and professional education; the conferring of degrees in veterinary medicine, after submitting candidates to examinations and otherwise; a proper system of electing Presidents, Vice-Presidents, and Members of Council, so as to afford the entire body of the profession a voice in this most important business, and give it an interest in everything pertaining to its own welfare;—all these, and other perhaps equally important changes and additions, have long been pressingly needed, and under our present constitution cannot be obtained. The deficiencies and demerits of the Charter of 1844 meet us at every turn, and improvement under it is hopeless. To attempt to repair its shortcomings by school charters is a silly and utterly useless piece of tinkering, inasmuch as these cannot in the slightest degree meet any of our requirements, nor apply to any of our necessities. When we have obtained new powers, and have satisfied the members of the profession that they can and will be employed to their advantage, then perhaps we shall have a chance of securing, by their hearty and liberal co-operation, a building worthy of our new position as a resuscitated body, and one of which we shall have no occasion to be ashamed. As matters at present stand, the great majority of the profession

keep aloof from aiding in an undertaking, the advantages of which to them, under the present *régime*, they cannot be made to see. It is only by inaugurating reforms which have for years been urgently necessary, and which must now be carried out, that the rank and file of the veterinary practitioners can be made to take an interest in their college; but these reforms cannot be ventured upon until we have the power with which to accomplish them. That power must be sought for in a new or greatly amended Charter, and it remains with the profession to say whether, and how soon, this is to be obtained.

THE CONVEYANCE OF HORSES AND CATTLE BY SEA.

EVERY year the question of the transit of horses and cattle by sea becomes of more importance, as the demand for these animals assumes greater dimensions. The requirements of Great Britain are not only rapidly increasing in this respect, but our great Indian empire, as well as our more important colonies, are now largely interested in the conveyance, safely and speedily, of these useful animals. For many years public attention has been directed to the manner in which this conveying has been conducted, particularly in our more immediate waters, and the gross abuses and unprofitable cruelties perpetrated in what is called the "cattle-trade," carried on by means of ships, has frequently enough roused public indignation, and demanded legislative interference. Gradually ameliorations have been brought about in the condition of the animals carried from one country to another by sea, but generally in the face of the strongest opposition from those who should themselves have introduced improvements, and whose interests were most closely concerned in humane transport. It would appear that the element of cruelty and suffering is largely mixed up with everything that concerns cattle, when they leave their pastures or stalls to end their career in the slaughter-house. To drive them harshly, to beat them brutally, and to

inflict every kind and degree of hardship and suffering upon them until they are converted into beef, appears to be considered business-like and commendable. And when it is sought to diminish suffering and maintain the health and condition of the cattle, and therefore preserve their value as food-producers, we are at once met with the silly and senseless question of expense. This question we need not discuss; as, if animals are to be carried from one place to another for the convenience and benefit of man, we have no right to inflict torture upon them in doing this, but should exercise every means in our power to convey them safely and without unnecessary hardship. Indeed, we have a direct pecuniary and sanitary interest in doing so; for surely nothing can be more unprofitable than ill-treating, starving, bruising, and suffocating animals, whose good condition, health, and soundness of their flesh, are of so much consequence. But cruelty is always purblind and illogical, and what it may imagine it gains is far more than counterbalanced by what it loses. It is a very short-sighted and narrow-minded policy which has prevailed for so many years in the cattle-trade; but there are signs that before long it will be subverted, and that animals will not only be transported in ships with a larger amount of that comfort which is so essential to their well-being, but that this will be effected with more profit to all concerned, than could be possible under the very unnatural and inhumane system for so many years prevailing. There is no reason why animals should not be carried comfortably and with economy; and, at any rate, we have no right to sanction the most glaring barbarity and loss, merely because those who cannot weigh the subject, and who are more or less directly concerned in the maintenance of what has long been a scandal, get up the bugbear cry of expense.

With regard to cattle, it has become evident that our Continental supplies are not so abundant as they once were: or, rather, that they are becoming more expensive in consequence of the increased demand for them on the other side of the Channel; and that in time we shall have to extend our search. Even in horses, we shall probably have to seek

for them in distant countries, where the supply is much greater than the demand. Already this necessity has been felt in India, and Australia and the Cape of Good Hope have been laid under contribution. Therefore it is that the safe and humane transit of horses and cattle by sea, and especially for considerable distances, has assumed such an importance, and leads us to consider seriously the best means by which it may be accomplished. Our own experience has demonstrated what serious results may follow from attempting to carry either horses or cattle for comparatively long voyages in ships imperfectly or improperly fitted for the purpose, and that there is much room for improvements, even in vessels which are often supposed to be well arranged for this purpose.

These improvements appear to consist mainly in proper fittings which will prevent injury to the animals, particularly during bad weather, and in thorough ventilation, with means for keeping the decks clean and sweet. The first of these *desiderata* has received the attention of a gentleman, Mr. Beavan, who has apparently solved some of the problems which have perplexed ship-carpenters, and devised a system by which cattle and horses can be conveyed on long sea voyages without injury, and in comparative comfort. His improvements will be better understood if we consult the annexed figures. In fig. 7 we have a side elevation; in fig. 8, a section; in fig. 9, a plan; and in fig. 10, a vertical longitudinal section. It will thus be seen that we have a series of stalls or pens, each capable of holding four animals, and they are formed of a fixed or moveable iron stanchion (A) at the corners; the stanchions which are at the head of the pen have cast-iron moveable clamps (B), with sockets to carry a plank (D), to which a wooden feeding trough (E), divided into compartments, is fitted. This trough can, by means of the clamps, be either raised or depressed at pleasure. Each compartment has a small trap (F) at the bottom, for cleansing purposes. For watering, moveable troughs of galvanised iron, fitting into the wooden troughs, are employed. Above the front plank (D) is a hollow iron bar (G), to which the head-ropes of the animal may be attached. The ends of this bar (G) are secured to the upright stanchions (A) by cast-

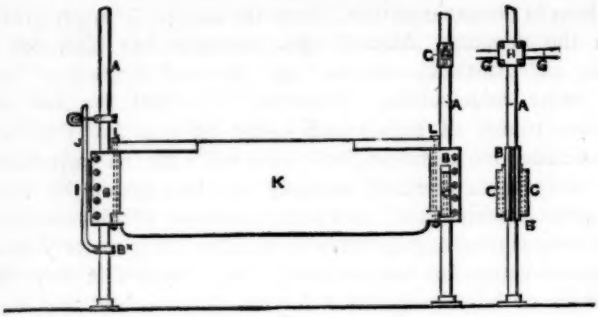

FIG. 7.

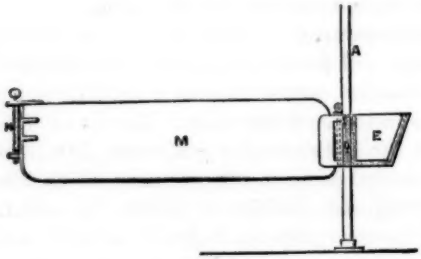

FIG. 8.

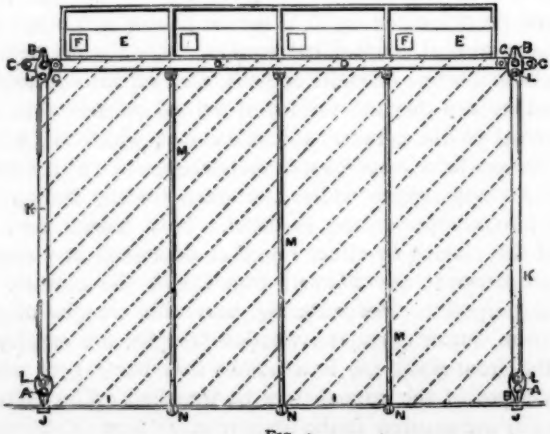

FIG. 9.

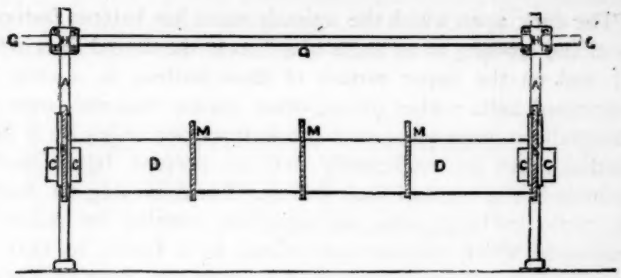

FIG. 10.

iron clips (H). The bar (G) and the plank (D) are sufficiently far apart to permit the animals to protrude the head to feed, while they are still close enough to give them support, should they be thrown violently forward by the rolling of the vessel. Along the back of the row of pens a flexible band (I) is carried. This band is composed of strong india-rubber machine belting, preferably of what is termed "four-ply," and is about fourteen inches wide. It is tightened by a roller and rachet, and is held to the backs of the pen by clipping levers (J) or by other suitable apparatus; the clips being carried by cast-iron clamps (B) bolted to the stanchions. By this invention the danger of injury to the hind-quarters of the animals, if thrown suddenly backwards, is obviated; at the same time they cannot kick the persons who clean the pens. At each side of the pen is a wooden plank (K), fixed by bolts to the clamps (BB) on the front and back stanchions, as in fig. 7. The planks can be easily removed by withdrawing the bolts. There are also, in addition to the end planks, dividing planks (M), separating the space into four stalls. These planks are made of light flexible wood, ash being the best. They are fixed to the front plank (D), as in figs. 8 and 9; and at their back end are secured to the flexible band (I), as in fig. 8, by the band being nipped between a metal piece fixed to the end of the board, and a rod (N), which has an eye at its upper end, and a tapering screw-bolt at the other extremity; so that the lower end of the rod is screwed into the hole which receives it. The rod approaches nearer to the end of the plank (K), and grasps the flexible band.

The deck upon which the animals stand has battens fastened to it, and crossing at an angle of 45°, as in the dotted lines in fig. 9; and on the upper surface of these battens is a strip of vulcanised india-rubber (o) or other elastic material, such as kamptulicon, secured so that the battens not only give a firm foothold, but are sufficiently soft to prevent injury to the animals in the event of their falling. For conveying the horses or cattle to their pens, an iron box running on rollers is employed, which contains one animal at a time; so that all may be lowered one by one, and conveyed to their stall without being handled, the ends of the box opening like a door, and are easily removed.

The india-rubber band entirely obviates the risk of injury rearwards as the ship is rolling; while the floor, being furnished with battens laid at an angle, affords foothold; and should the animal chance to fall, the india-rubber covering there is soft. The partition planks separate the animals in bad weather, allow space to lie down, and yet are not far enough from the deck to admit of their slipping through. It will be observed that all the stanchions, except those forming the pen itself, are abolished, and this allows clear space for cleaning and ventilation. By any other system of completely shutting off the animals from each other, additional stanchions are required, and the partition coming down to the deck is a manifest disadvantage. If desired, the rubber on the battens may be dispensed with, as also the strips forming the end planks of each pen. The moveable divisional planks being of ash, are both tough enough to resist any pressure from the weight of an animal falling against it, and sufficiently elastic to prevent any injury. The mode of fastening the ends is quite simple, and easily accomplished by one man; and the grip of the pins to the india-rubber bands is strong enough to hinder slipping.

The method appears to be very simple, so far as security is concerned. In order to suit convenience, the plank at the head, to which the manger is attached, can be raised or lowered as may be necessary; in the manger the food is, of course, placed, and the water required is forced from the main engine

into a pipe at the top of the pen, whence it is conveyed by hose to a galvanised iron trough made to fit a division of the manger, and which can be moved from one to other of the

FIG. 11.

divisions at will. Each division has a trap at the bottom by which it can be cleansed out at any time without being unhooked.

The whole appears to be admirably adapted for the conveyance of horses, mules, and cattle, during long voyages; and as these may be purchased at a comparatively cheap rate in distant countries, and find a profitable market in others, if they arrive free from injury and in fair condition, there is every prospect of the system being brought into general use before long.

THE DRUGGING OF ANIMALS ACT OF 1875.

A BILL to make the administration of poisonous drugs and compounds to horses and other animals by disqualified persons, and without the knowledge and consent of the owners of such horses and animals, a punishable offence, is certainly a novelty, even in these days of multifarious and oftentimes bewildering and curious Acts of Parliament; but there can be no doubt whatever as to the necessity there exists for some legal restraint upon a practice, or rather custom, which has prevailed almost from time immemorial. Grooms, coachmen, agricultural labourers, and other people of this description, are regularly in the habit of drugging the horses committed to their care, in order to make their coats look well, to cure some imaginary or real disorder, or for some mysterious reasons best known to themselves, while others drug horses with more sinister motives; and the owners have had to suffer, times without number, through the loss or inefficiency of their animals. And so it has been with the other domesticated creatures. The constituting the administration of poisonous drugs to animals by unqualified persons a misdemeanour, is therefore a step in the right direction, and we have no doubt that the Bill which has just passed through Committee, and will shortly become law, will prove a benefit to the human species, no less than the animals which it has been customary to make the depositaries of all kinds of deleterious nostrums. The only fault we have to find with the Bill is, that it does not include drugs which are perhaps more frequently administered than any of those in the list, and which, when given in often-repeated or large doses, are

really poisonous. For instance, not long ago in Kent, a farmer lost either two or three very valuable cart-horses, through the stableman having given them a large quantity of sulphur; and some time since we were called in to save the life of an officer's charger, which the groom had drugged with "black antimony." Neither of these substances, nor yet others which are in much request by the persons whom we suppose are to be reached by the Bill, are mentioned. Nevertheless, we have every reason to be satisfied that animals and their owners are likely to be protected in this direction, and that none but Members of the Royal College of Veterinary Surgeons can administer, or cause to be administered, certain specified drugs. The provisions of the Bill only apply to England; though we cannot understand why Scotland and Ireland are not included. To our certain knowledge, poisonous drugs are administered to animals by unqualified persons in both kingdoms, and we are not aware that such health-destroying agents are less potent in them than in this portion of Her Most Gracious Majesty's dominions. Possibly this omission, and some others we could indicate, may be repaired at another time; but their existence does not render us less thankful to Sir John Astley, Mr. Chaplin, and Mr. Rowland Winn, who prepared and brought before the House a Bill which will do them some credit, and the public much service, while it will at the same time confer a benefit on animals. It will be seen that its terms possess an interest for druggists and apothecaries, no less than for members of the veterinary profession. The Bill runs as follows:—

"WHEREAS it is expedient to make provision for putting an end to the practice of administering poisonous drugs and other compounds to horses and other animals by disqualified persons, and without the knowledge and consent of the owners of such horses and animals:

"Be it enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

"1. From and after the *passing of this Act*, if any person other than a member of the Royal College of Veterinary Surgeons of Great Britain, or any person acting under his direction, shall give any horse or other animal any one or more of the several articles named or described either in Part I. or Part II. of the Schedule A to this Act, without the consent of the owner of

such horse or animal, such person shall be deemed guilty of a misdemeanour, and shall, on conviction thereof, be liable for each offence to a penalty or sum not exceeding *ten pounds*, or to be sentenced to be imprisoned, with or without hard labour, for any term not exceeding *three calendar months;* but nothing in this Act contained shall exempt any person from any heavier punishment to which he might be liable under any other Act, provided that no person shall be punished twice for the same offence.

"2. The several articles named or described in Part II. of the Schedule A to this Act shall be deemed to be poison within the meaning of this Act.

"3. It shall be unlawful to sell any poison, either by wholesale or by retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison, and it shall be unlawful to sell any poison to any person unknown to the seller, unless introduced by some person known to the seller; and on every sale of any such article the seller shall, before delivery, make or cause to be made an entry in a book to be kept for that purpose, stating, in the form set forth in Schedule B. to this Act, the date of the sale, the name and address of the purchaser, the name and quantity of the articles sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser and of the person, if any, who introduced him shall be affixed; and any person selling poison otherwise than is herein provided shall, upon a summary conviction before two justices of the peace in England, be liable to a penalty not exceeding *five pounds* for the first offence, and to a penalty not exceeding *ten pounds* for the second or any subsequent offence, and for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller; but the provisions of this section shall not apply to articles to be exported from Great Britain by wholesale dealers, nor to sales by wholesale to retail dealers in the ordinary course of wholesale dealing, nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under the Pharmacy Act, 1868: Provided such medicine be labelled in the manner aforesaid, with the name and address of the seller, and the ingredients thereof be entered, with the name of the person to whom it is sold or delivered, in a book to be kept by the seller for that purpose; and nothing in this Act contained shall repeal or affect any of the provisions of an Act of the Session holden in the fourteenth and fifteenth years of the reign of Her present Majesty, intituled 'An Act to Regulate the Sale of Arsenic.'

"4. Penalties recoverable under this Act may be recovered in a summary way before any two or more justices of the peace in petty sessions assembled, and according to the provisions of any Act regulating the powers and duties of justices of the peace; and one-third of every sum of money recovered as a penalty under this Act shall be paid to the person who shall be the means

of bringing to justice any person committing any offence against any of the provisions of this Act.

"5. This Act shall not apply to Scotland or Ireland.

"6. This Act may be cited as 'The Drugging of Animals Act, 1875.'"

The following are the drugs and compounds referred to :—

PART I.

Arsenic and its preparations.
Prussic acid.
Cyanides of potassium and all metallic cyanides.
Strychnine and all poisonous vegetable alkaloids, and their salts.
Aconite and its preparations.
Emetic tartar.
Corrosive sublimate.
Cantharides.
Savin and its oil.
Ergot of rye and its preparations.
Oxalic acid.
Chloroform.
Belladonna and its preparations.
Essential oil of almonds, unless deprived of its prussic acid.
Opium, and all preparations of opium or of poppies.

PART II.

Sulphuric acid	or oil of vitriol.
Nitric acid	or aqua fortis.
Hydrochloric acid	or spirits of salts.
Muriatic antimony	or butter of antimony.
Sulphate of iron	or green vitriol.
Sulphate of copper	or blue vitriol.
Sulphate of zinc	or white vitriol.

THE EDINBURGH VETERINARY COLLEGE.

THE Edinburgh Veterinary College has sustained a loss in the resignation of Professor Dewar, lecturer on Chemistry, who has been, unanimously and without solicitation, elected to the "Jacksonian" Chair of Chemistry in the University of Cambridge. Professor Dewar's name is well known in connection with original work in Chemistry, and he, with another teacher at the same school, Dr. McKendrick, lecturer on Physiology, has been lately awarded a Government Grant for his researches in Science. The loss sustained by the school appears, however, to have been well compensated for by the election of Dr. Aitken, M.A., D.S.C., to the vacancy. This gentleman has something more than a local reputation, and is, we believe, looked upon as a rising man in his special department. This school has always been fortunate in its Chemistry teaching, and we have no doubt that the names of Wilson, Dalzell, and Dewar will not suffer by the addition of that of Dr. Aitken.

TUBERCULOSIS IN CATTLE.

THE *Köln Zeitung* states that, at its sitting on the 22nd of last April, the Veterinary Council of the German Empire came to the decision that, in order to combat successfully the panzoöties in Germany, it will be necessary to frame a general law applicable to the whole empire. At its meeting on the 23rd of the same month, it was occupied with the question as to whether or not the flesh and milk of animals suffering from the *perlzucht* (Tuberculosis) should be proscribed. After a discussion which lasted for four hours, the Council agreed, by a majority of twenty-two against six, that notwithstanding the important results obtained up to the present time, from the experiments and observations relative to the disease and to caseous Pneumonia—in all that concerns the transmissibility of these affections to man, there is not yet sufficient evidence to allow a scientific and definite solution to be arrived at. These experiments and observations are not sufficiently conclusive, in fact, in favour of the transmissibility of the above-mentioned affections to man, to justify the interdiction of the sale of the milk and flesh derived from diseased animals.

At the same sitting, the Council entrusted its permanent committee with the drawing up of a report for the information of the Chancellor of the Empire, with regard to soliciting the necessary means for researches to establish whether the milk from cattle suffering from tuberculosis has an injurious effect on mankind, and, if so, the nature of this action.

RACING SPEED.

ONE of the effects of the weather that has prevailed this spring has been to make the time of some races unusually fast. The ground has not yet become so parched and hard as to try dangerously the legs of horses going at full speed; but while retaining some of its elasticity, and enabling the hoof to get a good footing in it, it has been too firm to interfere with the pace by allowing the horses' feet either to stick or slip. A French paper, commenting on the racing season, notices the exceptionally quick time in which the "Prix du Jockey Club" at Chantilly was won a few weeks ago, and takes occasion to discuss the relative pace of men, horses, and trains—or, in other words, the three most ordinary modes of modern locomotion. Reckoning from the time of the race at Chantilly, the *Constitutionnel* sets the extreme pace of the horse for a distance of between one and two miles at fifteen yards to the second, and states that the utmost speed of man is less than half as good. This estimate is not far wrong, and does some credit to a French writer, who, probably, never attended a race meeting at Lillie Bridge. Almost every Englishman knows that the time of a hundred yards' race is about ten seconds, giving thus ten yards a second as the result, or two-thirds as good a pace as that of Salvator. But this pace is altogether exceptional,

and limited to the very shortest distances. It may be kept up for another fifty yards, perhaps, but not longer; and directly the human runner is started on even the shortest course to which horses are accustomed, his inferiority becomes much more marked. In a mile race, 6½ yards in a second may be considered quite the extreme speed. Amateurs do not attain it, and the professionals who can exceed it may be counted on one's fingers. For half a mile 7⅓ seconds is the amateur, and perhaps 7½ the professional limit. From a mile to five miles the falling off in pace is great, but at about ten miles it becomes again about half as good as that of a tolerably well-weighted race-horse. With regard to trains, leaving out of consideration the tremendous expresses of the Great Northern and Great Western lines—which far exceed 50 miles an hour, including stoppages—the average express speed in England will be about 40 to 45 miles an hour, or 22 yards in a second. Roughly speaking, for distances of over ten miles, the horse goes twice as fast as the man, and the train twice as fast as the horse. Over a quarter of a mile distance a tolerably weighted train would be beaten by a man, and over a mile by a race-horse. For fifty yards the latter would usually be outstripped by the biped. In a word, each locomotive has its pet distance—the man a hundred yards, the horse a mile, and the train about fifty miles.—*The Globe.*

TRICHINOSIS.

Saxony and Thuringia have been for a long time remarkable as countries in which Trichinosis—that severe disease due to eating pig-flesh infested with trichinæ—most frequently prevails. It appears from time to time as an epidemic malady, and makes numerous victims.

According to the *Agronome*, the towns of Halle and Anhalt, as well as their suburbs, are now particularly visited by it, and many people have died. The Government has adopted preventive measures, although it is very difficult to contend with a disease of this kind, which nearly always terminates fatally.

It also appears that the malady has emigrated to France; as some time ago the carcases of seven or eight pigs, infested with trichinæ, were seized by the veterinary inspector of the abbatoir at Libourne (Gironde), and buried by order of the authorities.

HORSE-POX.

At the Séance of the Académie de Médecine of Paris, held on April 27th, M. Depaul described a case of Horse-pox, which he had observed along with M. M. Lorain and Blot. The horse had come from Germany, and had been only a short time in Paris. The symptoms were fever and prostration, elevation of temperature, cough, tumefaction of the submaxillary lymphatic glands, and in the left nostril a series of circular prominent pustules; these were depressed in their centre, and offered

characteristics analogous to those of the variolic pustule. There was a discrete eruption of similar pustules over the whole of the body. A child and a young cow were inoculated with the matter from this horse, and M. Depaul promised to report the results obtained.

CONTAGIOUS PLEURO-PNEUMONIA IN IRELAND AND NORFOLK.

For many years Irish cattle have been blamed as the bearers of Contagious Pleuro-pneumonia into England and Scotland, with what truth we will not now seek to show. It is certain that this belief has been shared by a large number of persons who were in a position to form an opinion as to the causes for the persistence and extension of the scourge, and from time to time the notion has been brought before the public more or less prominently. In April last it was discussed in the House of Commons, and the discussion resulted in an application for a copy of a Report which had been drawn up by Mr. Chambers, Veterinary Surgeon to the Veterinary Department of the Irish Privy Council, relative to the cases of the disease among cattle recently imported from Ireland into Norfolk, and also Professor Ferguson's Report on the same subject. Both Reports are now before us; and, as the matter is of great and pressing importance, we think it our duty to notice them. Mr. Chambers was sent to Norfolk to inquire into the outbreaks of this disease in that county, which has a most extensive trade in Irish and other cattle, carried on chiefly at the weekly market held at Norwich; which trade "necessarily makes the county of Norfolk a great centre for the spread of contagious diseases; and as the supply is almost solely from Ireland, public opinion naturally blames that country for the introduction of Pleuro-pneuomia," though, Mr. Chambers thinks, not without a certain amount of prejudice. He, however, says:—

"Judging from the returns of the county received at the office of the Central Committee, little doubt exists but that Norfolk stockowners sustain heavy losses from disease in freshly-purchased stock, and certainly some amount of suspicion rests upon Irish stock, as occasionally being the medium of introduction of Pleuro-pneumonia. For, as you will see by annexed copy of inspectors' special reports, out of 178 outbreaks, 58 occurred within one month, 54 within two months, and 66 within three months from the date of purchase, apparently proving that many of the infected animals were incubating the disease when sold. But, in fairness to Irish cattle, I may state that we have no positive proof of the cattle in question being all directly imported from Ireland, although it is most probable that such was the case with the majority of those sold at Norwich, Lynn, Dereham, and Fakenham markets.

"And again we have to consider the doubtful question about the period of the incubative stage in Pleuro-pneumonia, together with other peculiarities of the disease; for such strange incidents occur in practice, and such varied opinions exist with professional men and others, that it leaves little doubt that Pleuro-pneumonia is a disease but imperfectly

understood in the present day, which shows the advisability of adopting a well-conducted series of experiments (of a more practical and extensive nature than those recently carried on in London), to further enlighten the profession upon the pathology of the malady.

"My own experience, as well as that of others, proves that Pleuro-pneumonia is seldom incubated less than three weeks, or more than two months. But, taking three weeks for the average, which period compares closely with the time between dates of purchase and outbreak in many cases in annexed list, a fact which shows some probability of Irish cattle being exposed to contagion, either in transit or after their arrival in England; although I am perfectly aware that a diseased animal cannot be shipped at any of the Irish ports, unless under very exceptional circumstances; nor is it likely that a case would be in that stage previous to shipment, so as to break out on the passage.

"I am further aware of the comparative freedom of cattle diseases in the country districts of Ireland, that is, so far as official reports and my own observations are to be valued. And again, under the existing regulations, there is little probability of healthy cattle coming in contact with others suffering from Pleuro-pneumonia on railways, or in public fairs or markets. Yet, with all these facts, Lung-distemper undoubtedly breaks out amongst newly-purchased Irish cattle, within the admitted period of the incubative stage, from the date of embarkation, which proves that we have either more infected herds in Ireland than are officially reported, that exported cattle are exposed to contagion in transit, or, lastly, that we must dismiss a portion of the "contagion theory," and allow of the possibility of spontaneous origin under certain predisposing and exciting causes, together with idiocrasy on the part of certain animals. However, it certainly seems probable that many of the infected animals alluded to would have continued healthy, provided they had remained in their own country. Yet I do not venture to form an opinion upon this point, but must confess that I fail to trace satisfactorily the true origin of the many outbreaks of Pleuro-pneumonia amongst Irish cattle imported into England.

"I may add that the weekly returns of the fresh cases of Pleuro-pneumonia in the county of Norfolk are but small, considering the large number of cattle sold in Norwich and other markets, about five being the average of the last few weeks, although a much larger number were reported during the months of September, October, and November.

"I also learn that many outbreaks originate in young stock, disembarked at Bristol for St. Ives market, many of which find their way into Norfolk.

"I have had many opportunities of inquiring into the sanitary condition of Irish cattle in the Midland Counties, purchased at Bristol, Hereford, and Gloucester markets, but can hear of no particular complaints against them in that part of England; but of course the cattle trade there is principally in home-bred stock, and as far as Herefordshire is concerned, neither Pleuro-pneumonia nor Foot-and-mouth disease is scarcely known.

"Whatever blame may be attached to Irish cattle relative to introducing Pleuro-pneumonia into England, they are, in my opinion, almost blameless in the introduction of Foot-and-mouth disease; for it is distinctly noticed by the inspector at Norwich, that the cattle direct from the ports of disembarkation are always perfectly healthy, and, on the other hand, if they have previously stood another market, some of them will certainly show symptoms of disease, proving that the animals are exposed to the contagion in England.

"So that there is little doubt that if cattle were exported from England to Ireland, the Irish stockowner would have more reason to complain than farmers in England have at the present day. And one thing is certain, viz., that England cannot do without Irish cattle; so that unless it becomes absolutely necessary, no further legislative measures must be adopted to restrict so important a branch of trade as the one in question.

"In conclusion, I may state that the present system of branding animals at the ports of embarkation does not attain the desired object, and it would consequently be advisable to adopt an improved system.

"Upon inspecting the Irish cattle at Norwich market, I was unable to detect that a single animal had been branded, the marks having been obliterated by some means. I also found that the inspector was almost ignorant of such a system being in use."

(*To be continued.*)

SPECIFIC CONTAGIA AS A CAUSE OF DISEASE.

In one of a series of lectures on specific contagia, delivered at Owen's College, Manchester, Dr. Burdon Sanderson concurs in the opinion expressed by Professor Chauveau, of the Lyons Veterinary School, to the effect that the contagium of transmissible diseases is definite in form, or "particulate." By having recourse to a particular mode of diffusion first practised by Chauveau, it can be demonstrated that the fluid portion of contagiferous matter does not contain the virus, and that the solid residue is really the propagating element. Dr. Sanderson is inclined to believe that the contagious property is associated with the presence of particles possessing a vitality different to that of the diseased creature, and that these particles can remain for a lengthened period in a latent or dormant condition; though when exposed to favourable influences they may at once be roused into full activity. The particles discovered in vaccine virus, and supposed to be the active element, are described by Sanderson as very small spheroidal bodies lying isolated or in groups of two, and offering the same physical and chemical characters as micrococci. He enters into details as to the origin and progress in development of a Small-pox and Sheep-pox pustule, from which it appears that the latter is the centre of an inflammatory process, the commencement of which is at the line of junction between the dermis and epidermis. Here a general germination occurs, with enlargement of certain cells, which subsequently become vacuolated and form cysts. These latter coalesce, and in this way cavities are constituted in the dermis, which is increased in thickness from the effusion of fluid into its texture. Pus, due to the escape of leucocytes from the blood-vessels, appears in these cavities and in the dermis. Bacteria are not observed in the early stages of the inflammation, though they are present at a later period.

Annals of Veterinary Science.

ANATOMY AND PHYSIOLOGY.

NOTES ON THE PRESENCE OF TWO PRECAVAL VEINS IN A DOG.

BY M. R. SIMPSON.

(*Journal of Anatomy and Physiology*, May, 1875.)

IN the dog, as in the human subject, the blood from the head, neck, and pectoral limbs is normally returned to the right auricle of the heart by a single precaval vein, formed by the junction of the right and left innominate veins.

In man, as is well known, owing to the persistence of the left duct of Cuvier of the embryo, two superior or precaval veins are occasionally met with. A few months ago, while dissecting a young puppy which had been drowned, so that the veins were all gorged with blood, Mr. Simpson found, on raising the sternum and removing the thymus gland, two distinct precaval veins, each formed by the junction of the jugular and subclavian veins of its own side, so that there was no left innominate. The right vena cava ran its natural course by the side of the innominate artery, to open into the right auricle, being joined shortly before doing so by the vena azygos major. The left vena cava lay at first over, and almost parallel to, the thoracic portion of the left subclavian artery; then gradually crossing it, passed backwards over the root of the left lung, and reached the dorsal surface of the heart, where it opened into the coronary sinus, which was of considerable size. A small vertebral vein opened into it close to its origin, and nearer the heart it was joined by a small superior intercostal vein. In this specimen, as in the abnormal disposition of the great veins occasionally occurring in man, the presence of a left precaval vein was due to the persistence of the left duct of Cuvier.

LOCALISATION OF THE VASOMOTOR CENTRE.

BY NUSSBAUM.

(*Pflüger's Archiv*, x. 6, 7.)

IT was proved by Pflüger, some twenty years ago, that the vasomotor nerves run in the anterior roots of the spinal nerves, and that electrical stimulation of the spinal cord, after its separation from the brain and medulla oblongata, causes visible contraction of the arteries in the mesentery of the frog. This phenomenon is ascribed by most physiologists to irritation of vasomotor fibres contained in the cord, but originally derived from a centre situated in the medulla oblongata. This localisation of the vasomotor centre rests chiefly on the ascertained fact that in warm-blooded animals the systemic blood-pressure rises as high after irritation of sensory nerves, when the cerebro-spinal axis is divided above the medulla, as in animals whose nervous centres are intact; while if the cord be cut *below* the medulla oblongata, such irritation no longer causes any increase of arterial tension. Nussbaüm (Pflüger's *Archiv*, x. 6, 7) finds that in frogs, after complete removal of the brain and medulla oblongata, mechanical, chemical, and electrical stimulation of afferent spinal nerves invariably determines reflex contraction of the arterioles in the web and mesentery, and that this result no longer follows if the cord has been previously destroyed. He concludes, accordingly, that the

spinal cord possesses an independent authority over the systemic arterioles, and that the medulla oblongata, far from being the exclusive seat of vaso-motor government, contains only the upper end of the governing centre.

THE THERMOMETRY OF THE DOMESTICATED ANIMALS.

BY SIEDAMGROTZKY.

(*Deutsche Zeitschrift für Thiermedicin.*)

IN the *Bericht über das Veterinärwesen im Königreich Sachsen* for 1873, Professor Siedamgrotzky gives the results of his researches on the temperature of several of the domesticated animals. The thermometer he employed was manufactured by Litzmann and Oeltsch of Dresden, and had a range of between 37° and 41° Centigrade (98·6° and 105·8° Fahr.); it was corrected at the Dresden Mathematical and Physical Museum. The temperature of the animals upon which his observations were made was always taken in the rectum. The following are the results :—

I. TEMPERATURE OF THE HORSE.—The average temperature of one hundred healthy horses, as observed in the morning, mid-day, and evening, was ascertained by Siedamgrotzky to be 38° Cent. (100·4° Fahr.). The highest temperature recorded was 38·2° (*circa* 101° Fahr.). Krabbe found the average temperature of horses to be 38·1°; Peters, 37·5° to 38·2°; Fleming, 38·75°; Davy, 37·5°; Sonnenberg, 37·38°; and Prevost and Dumas, 36·8°.

INFLUENCE OF AGE.—In a healthy foal, during the first five days of its existence, the temperature was 39·3° (*circa* 102·75° Fahr.). The temperature of the dam at the middle of the first day was 38·4°, on the second day 38·8°, on the third day 40·0°, on the fourth day 39·1°, and on the fifth day 38·5° Cent. In youth, from two to five years old, the temperature is somewhat high (38·1° Cent.); but from five to ten years of age it rather falls (38·0°). From ten to fifteen years, however, it attains its highest point (38·2°), and in old age (twenty years and upwards), it descends considerably (from 37·9° to 36·9° Cent.). These results are derived from observations made on sixty-eight horses.

INFLUENCE OF SEX.—The average temperature of twelve observations in stallions was 37·8° (100·1° Fahr.); of twenty-five observations in mares, 38·2° (*circa* 101° Fahr.); and of forty-two observations in geldings, 38·05°.

INFLUENCE OF THE PERIOD OF THE DAY.—The maximum temperature was indicated at six o'clock in the evening, when it was 38·2°; and the mini-

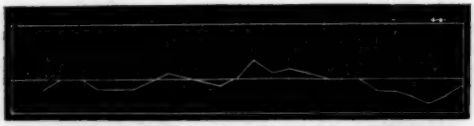

FIG. 12.
Curve of the diurnal fluctuation of temperature in horses from six p.m. to six a.m.

mum temperature at four o'clock in the morning, when it was 37·5°. Feeding plays rather an important part in this respect. The annexed cut (fig. 12) shows the temperature at different hours.

INFLUENCE OF FOOD.—During (as a consequence of the action of the masticatory muscles?) and after feeding, there is a rise in temperature of 0·2° to 0·8° Cent. In from three to five hours, however, this disappears, and the normal temperature prevails.

INFLUENCE OF DRINKING.—Ingesting from half to a pailful of water (at a temperature of from 46° to 53° Fahr.), diminished the temperature from 0·3° to 0·5° Cent. The normal temperature was regained in five or six hours after drinking. With some animals the temperature fell 1° Cent.

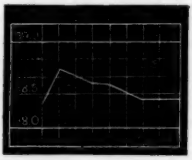

FIG. 13.

Variation of temperature-curve in horses after feeding. o denotes feeding-time; the figures which follow indicate the hours after this period.

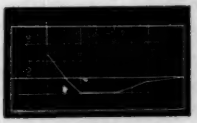

FIG. 14.

Variation in the temperature-curve in horses after drinking. Letters and figures as in fig. 13.

Feeding and drinking act antagonistically to each other with regard to temperature; so that when both are in operation, the one compensates for or neutralizes the effect of the other, in such a manner that there is no variation in the normal temperature, or merely a trifling fluctuation upwards or downwards.

INFLUENCE OF EXERCISE.—Exercise increases the temperature, though to a very variable extent in different horses. Exercising at a walking pace for three-quarters of an hour, when the air is at a temperature of 86° to 104° Fahr. gives an increase of 0·3° to 1° Cent., or an average of 0·6° Cent. After standing for half-an-hour afterwards in a stall, the temperature was still 0·2° higher than usual. Trotting for thirty minutes in a temperature of 50° Fahr. raised the thermometer from 0·4° to 1·9° Cent. (or an average of 0·9° Cent.) About two hours after trotting, the normal temperature was regained. The temperature fell suddenly at first, then gradually, until it reached the ordinary standard. With some horses which had perspired profusely, the temperature fell, an hour and a-half after they returned to the stable, from 0·1° to 0·2° Cent. below the original temperature. The breaking out of the perspiration was independent of the increase of temperature.

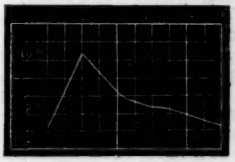

FIG. 15.

The temperature variation-curve noted in horses during half an hour's trotting exercise (o—½), and for four half-hours after.

INFLUENCE OF THE EXTERNAL TEMPERATURE.—Horses which had been standing in a stable, the temperature of which was 25° (77° Fahr.), were exposed for four hours to an external temperature of from 31° to 43° (87·8° to 109·4° Fahr.)* The body temperature increased from 0·4° to 1·2° Cent. The maximum increase occurred after an hour and a-half's exposure (there being a difference of 9° Cent. between the body temperature in the stable and out of doors). In a draught the increase was much less. The low temperature of winter, notwithstanding the sudden abstraction of heat from the skin (stable

* A very brief abstract of this paper appeared in the *London Medical Record* for June 23, in which it is stated that "Horses placed in a stall at a temperature of 25° Cent., showed a temperature four hours afterwards of from 31° to 43° Cent." (87·8° to 109·4° Fahr.!). Of course this is an error. The above is the correct translation.—*E. V. J.*

temperature 50°, temperature of the external atmosphere from 24·8° to 34° Fahr.), has also the effect of increasing the temperature in the rectum something like 1·2° Cent.—two hours' stay in the open air raising it 0·5° Cent. above the original temperature.

INFLUENCE OF CLIPPING.—This was noted in the horses. The temperature rose after clipping from 38° and 38·3°, to 37·7° Cent., and remained so on the following day. With a clipped horse intended for dissection, the normal temperature was restored in five days. In order to ascertain the effects of exercise on clipped and unclipped horses, six which had not been deprived of their coats, and six which had been clipped for two months—all belonging to a cavalry regiment—were employed for comparison. These were trotted and galloped for half an hour, when the clipped horses offered a higher temperature in the rectum by 0·1° Cent. than the unclipped. Besides, with the clipped horses the return to the normal temperature after exercise was more steady and regular than with the unclipped.

FIG. 16.
Temperature-curves of clipped (.....) and unclipped (———) horses, after half an hour's trotting exercise.

INFLUENCE OF PHLEBOTOMY.—Four experiments on old "anatomy horses." After abstracting from five to six pounds of blood, the temperature sank but once 0·1° Cent.; in other instances, within from one to three hours the temperature in the rectum was greatly increased—from 0·7° to 1·6° Cent.

II. THE TEMPERATURE OF CATTLE.—A nine-year-old cow; thirty-nine observations. The average temperature was found to be 38·9° Cent. (102° Fahr.) (Krabbe gives 38·80° and Davy 38·90°.) The daily variation was small, when compared with that of the horse. The minimum temperature was noted at midnight (38·7° Cent.), and the maximum at five o'clock p.m. (39·1°=102·3° Fahr.) Feeding did not make any difference.

III. THE TEMPERATURE OF SHEEP.—In these animals the variations are greatest. The observations (284 in number) were made on six hoggets, and the temperature in the rectum was found to be from 38·5° to 41·8° Cent. (101·2° to 107·8° Fahr.), or a mean of 40·2° (104·2°). (Flemming gives 40·25°, and Krabbe 39·8°.) To what this great variation is due has not been ascertained. Shearing, as a rule, causes an increase in temperature of 0·5° to 1·1° Cent. This, however, is of short duration; and in one sheep the temperature sank and remained during the first day below the normal standard, but on the second day there was a considerable rise. With unshorn sheep (157 observations) the average temperature was 40·56° Cent., and in those which were shorn (94 observations), from three to twenty-four days after the operation, it was 39·73° Cent.

IV. THE TEMPERATURE OF SWINE.—Observations (169 in number) on four swine, aged from four to six months, gave a temperature varying from 38·3° to 40·8° Cent., or an average of 39·6°. (Flemming gives 40·5°, Krabbe 39·1°, and Gurlt 40° to 41·2°.) The external temperature has a marked influence on pigs.

V. THE TEMPERATURE OF DOGS.—The body temperature of dogs is liable to important variations, depending upon the external temperature. In 190 observations on seventeen dogs, the normal temperature was ascertained to be 38·3° Cent. (101° Fahr.). (Fleming gives 38·5° and Krabbe 38·7°.) The evening increase was about 0·2°; and feeding raised the temperature 0·3°. The out-door temperature has most effect on the dog, but this varies with individuals. While with one dog, which had been lying in the sun for an

hour, exposed to a heat of 40° (104° Fahr.) there was an increase of 1·8°; with another dog there was only a rise of 0·4°.

These interesting observations on the normal temperature of the domesticated animals are followed by some judicious remarks by Siedamgrotzky, with regard to the temperature in disease. *The temperature of the body is closely dependent upon the amount of heat produced, and that which is given off.* The greater the production of heat and the smaller the quantity expended, so the higher will be the body temperature. But even with an increased heat production the body temperature may be very slightly raised, if the heat given off is great; and inversely may a high temperature be noted in the rectum when the heat production is small, but the expenditure still smaller. The chief regulator of the body temperature is the skin, *with the epidermis and hair.* Every influence which diminishes the quantity of the blood in the skin (especially by cutaneous transpiration) will also diminish the amount of heat given off from it. This explains what, at the first glance, is an astounding fact,—that immediately after death, in the cold stage of intermittent fever in man, and also immediately after the action of cold upon the exterior of the body, the internal temperature (in the rectum) ascends. Under all these conditions, whenever the amount of blood in the skin is diminished, so will the loss of heat be lessened. Consequently, they are, for the most part, interdependent; and so it is that with clipped and exercised horses we have a higher temperature noted in the rectum, at least afterwards, than with the unclipped. The fact that the latter is more easily made to perspire than the clipped horse, a circumstance remarked by Siedamgrotzky, also denotes a loss of heat and a somewhat lower temperature than in the clipped animal.

It would be of interest in such circumstances, also, always immediately to take the temperature of the skin; this can be done with the greatest facility if the bulb of the thermometer is inserted into a hole bored in a piece of cork, and this placed against the part of integument selected for the purpose. The more gorged with blood and the softer the skin previously, so in proportion will it give off heat, and the temperature be lowered. The temperature of the body can be more depressed by a tepid bath (68° to 72° Fahr.) than by a cold one—at least for a short period.

The information given by Siedamgrotzky, with regard to perspiring appearing to depend upon the elevation of temperature, is interesting. The essential influence of the induced perspiratory condition, it is manifest, is related to the structure, size, and development of the sudoriparous glands, as well as the quantity of blood and its movement in the vessels of the skin, and this again to the state of innervation of the vessels.

One fails to see at first what is really a fact—that bleeding a horse brings about an increase of temperature. The cause, at all events, depends upon a diminution in the heat given off from the body; although the decomposition of the albumen, according to Bauer, is accelerated, and the carbonic acid at a latter period lessened. The increase in the production of heat continues much longer, for instance, than the increase of temperature, so that they therefore cannot be related. It must be due to a contraction of the blood-vessels produced from the central organ, and through this a decrease in the heat given off.

PATHOLOGY AND MORBID ANATOMY.

THE CAUSE OF THE SO-CALLED "ERYSIPELAS" IN PIGS.

BY BOLLINGER.

(*Deutsche Zeitschrift für Thiermedicin. Ersten Bandes, Erstes Heft.*)

THE rapidly fatal porcine malady which has received many designations, but chiefly that of "Erysipelas," and which is very common and sometimes most destructive in Europe and America—sweeping off the tenants of the piggeries over a wide extent of country—has been quite recently investigated anatomo-pathologically, by Bollinger, of the Munich Veterinary School, who has already earned a very high name for himself on the Continent as a comparative pathologist, and whose researches on different forms of blood-poisoning and the diseases produced by entozoa have proved most valuable. One of his latest contributions was on Colic in the horse, with reference to the existence of worm-aneurism of the visceral arteries, the entozoon being the Palisade strongle (*Strongylus paradoxus*).

In this pig disease, he has discovered the same worm in myriads in the lungs of pigs which, it was supposed, had died of the anthracoid malady. We are not aware that the Palisade strongle has hitherto been found in the pig in the situation where it was discovered by Bollinger, neither do we think that it has been even suggested that the disease was due to entozoa. As it is frequent in this country, and particularly in Ireland, every opportunity should be utilised to confirm or negative Bollinger's opinion with regard to its cause. His description is published in the first number of the *Deutsche Zeitschrift für Thiermedicin.*

On the 28th of October, 1874, the carcases of two pigs, aged about four months, were brought to the Munich Veterinary School for examination, with a view to learn the cause of death. These had formed part of a drove of twenty, four of which had suddenly perished during the previous night. Nothing had been noticed amiss with the drove on the previous day, and in the evening they ate their food as heartily as usual. About fifteen hours after death the bodies were examined, and the following were the principal lesions observed:—

On the surface of the skin there was nothing abnormal to be seen, and the natural openings of the body did not present any change; the visible mucous membrane was cyanotic; at the nasal openings was remarked a quantity of greyish, sticky, dirty-looking mucus, which had escaped through gravitation. The submaxillary lymphatic glands were enlarged; the subcutaneous connective tissue in the anterior part of the body was hyperæmic and somewhat œdematous. The tongue, pharynx and larynx, and trachea were normal in one pig; but in the other the pharyngeal mucous membrane was greatly injected and reddened (Catarrhal Angina), and this condition extended to the larynx and upper part of the trachea; in the trachea itself was a quantity of whitish foam, and the connective tissue and muscles surrounding it were gorged with blood.

In the cavity of the thorax and the pericardium, as well as in that of the peritoneum, was a moderate quantity of transuded serum slightly tinged with blood, which in the latter was mixed with little masses of fibrin. In the right ventricle of the heart were some small sub-endocardial petechiæ; the blood was everywhere very dark, and partially coagulated.

The lungs were a little collapsed, red-coloured, moderately soft and œdematous behind as well as before, and in the posterior and upper portions were manifestly less permeable to the air. In the larger bronchi, near a

moderate quantity of fine foam, was found a muco-purulent deposit on het injected mucous membrane; in the medium-sized bronchi the same was noticed, while the finest tubes were covered internally with pus and mucus. In the supero-posterior part of the lung tissue, which was œdematous, destitute of blood, and partially impermeable, was a cork-like mass in which were found a multitude of moderate-sized specimens of parasites—the STRONGYLUS PARADOXUS: in one case 14—15, in the other 40—50 of these creatures.

The large glands in the cavity of the abdomen—liver, spleen, kidneys—were cyanotic to an extreme degree, but were otherwise normal. The mesenteric vein was distended with blood, and the intestinal tract was friable and œdematous; neither stomach nor intestines contained anything abnormal.

A microscopical examination of the blood and all the organs revealed nothing unusual; only in the upper and posterior portions of the lung, which exhibited the above-mentioned alterations—bloodlessness, diminished elasticity, great infiltration, and a lessened air-capacity—everywhere were found in the compressed alveolar endothelium of the partially choked air-cells, as well as in the terminal bronchi, extremely numerous ova in every stage of development, and very many embryoes of the before-named Palisade worms (*Strongylus paradoxus*) still alive and quite vivacious.

The anatomical diagnosis was therefore: *Palisade worms* and their progeny—ova and embryoes—in the finer bronchi and in the texture of the postero-superior part of the lung; *Bronchitis* and *Bronchiolitis verminosa, with commencing Pneumonia, Lung œdema, general Cyanosis, acute Hydrops of the serous cavities, intense hypermiæ of the larynx and pharynx, as well as of the surrounding muscles, and hæmorrhagic patches on the heart.*

The sudden death of the pigs was, judging from the lesions found in the two, undoubtedly due to the acute œdema of the lungs, and this was brought about by the larger worms in the medium and finer bronchi, as well as their progeny which had lodged themselves in the lung tissue.

On several grounds which, on account of their leading to detailed statements, could not be referred to in this preliminary description, Bollinger ventures the opinion that at least some, or even the majority, of the cases which die from the rapidly fatal disease named "malignant erysipelas" (*Bösartiger Rothlauf*), or "swine-plague" (*Schweinseuche*), and which is supposed to belong to that multiform malady Anthrax (*Milzbrand*), are due to the cause and lesions observed in the above-described instances. But he could only perceive in these cases traces of that important symptom which characterises the so-called Anthrax, and by which its presence is interpreted—the skin œdema; though there was also another lesion observed in that disease, and upon the presence of which the best writers (Furstenberg, for instance), have laid great stress—the presence of fluid in the pleural sac (Hydrops). The other important and numerous indications of Anthrax were not seen. Finally, Bollinger insists to the last that death can result from the before-mentioned parasites, even when they are entirely absent from the bronchi, or at least are invisible to the unaided eye; for even then certain portions of the lung may harbour many thousands of embryoes, whose presence can only be revealed with the assistance of the microscope. For the further elucidation of this most interesting and important question, Bollinger appeals to those who have the opportunity, to send him the lungs of pigs which have perished from erysipelas.

THE HISTO-PATHOLOGY OF SHEEP-POX.*

BY DR. KLEIN, F.R.S.

VARIOLA OVINA, or "sheep-pox," is a disease which, although it is not communicable to man, and possesses a specific contagium of its own, very closely resembles human Smallpox, both as regards the development of the morbid process, and the anatomical lesions which accompany it. This correspondence is so complete, that it cannot be doubted that the pathogeny of the two diseases is the same. That is to say, that whatever explanation can be given of the way in which the material cause or contagium produces its effects in the one case will also serve as a key to the understanding of the other. The present investigation was, therefore, undertaken in the confidence that the application of the experimental method to the investigation of the ovine disease would not only yield results of value, as contributory to our knowledge of the infective process in general, but would throw special light on the pathology of Smallpox.

In the following pages I propose, after giving an account of the method of investigation employed, to describe, first, the microscopical characters of the Sheep-pox virus, and to compare them with those of vaccine lymph. I shall then proceed to detail the results of my investigation of the pathological changes which occur in the affected parts of the skin.

Method of Investigation.

The purpose of the inquiry being to determine the nature of the pathological process, of which the cutaneous eruption is the most prominent, and probably the most important manifestation, it was necessary to examine the affected skin anatomically in all stages of the development of the disease. In order to obtain the material for this investigation, I communicated the disease by inoculation to a sufficient number of sheep. In this way I obtained specimens of skin, corresponding to each successive period in the development of the pustule, which had been removed from the animal in a perfectly fresh state. With the aid of the complete and continuous series of preparations of which I thus became possessed, I was enabled to study the process in a most satisfactory manner.

The lymph used for inoculation was obtained from two sources, one quantity having been sent to me by Professor Chauveau, of Lyons, the second by Professor Cohn, of Breslau. In some of the inoculations the lymph was first diluted with from fifteen to twenty times its volume of half per-cent. solution of common salt; in others it was used undiluted. No difference was observed as regards the results between the diluted and undiluted liquids; in all cases the instrument employed for insertion was a Pravaz syringe.

A drop having been drawn into the steel canula of the instrument

* From the Report of the Medical Officer of the Privy Council.

(the width of which does not exceed a fortieth of an inch), it was passed under the surface of the skin, as in subcutaneous injection. In order to avoid bleeding, great care was taken to direct the needle in such a way that it penetrated the true skin as little as possible. Before discharging it, the canula was always slightly drawn back, so as to leave the channel previously made by its point free for the reception of the expelled liquid. It will be understood that in using a subcutaneous syringe for inoculation in the manner above described, the only part of the instrument which is occupied by the liquid to be inserted is the extremity of the steel tube; the extremely small quantity of liquid which is thus employed is ejected at the desired moment by the compression of the air behind it.

Although there can be no doubt that the nature of the pathological process in the skin is the same whether it is determined by the direct insertion of the virus into the affected part, or is conveyed to it by the circulation, yet it appeared clear that the value of the results would be impaired if the investigation extended only to the local effects produced by inoculation. I therefore felt it to be very desirable (considering it was out of the question to obtain opportunities of studying the disease as it occurs naturally) to induce it in a form resembling the natural one as closely as possible.

Natural Sheep-pox, as acquired by the ordinary modes of infection, is characterised by a general eruption, the first appearance of which is accompanied by an accession of fever.

I had not only learned from my own observation that no general eruption could be induced by inoculation, but found, on referring to authorities, that in those countries in which inoculation is carried on on a very large scale, with a view to the protection of animals from attacks of the disease, it is extremely rare to meet with instances in which secondary pustules present themselves in addition to the primary one at the seat of insertion; it was therefore necessary to employ some other method.

I fortunately succeeded completely in producing a general eruption by introducing the Sheep-pox virus into the circulating blood. Having diluted the liquid with from fifteen to twenty times its bulk of the solution of chloride of sodium already referred to, I injected it directly into the external mammary vein of a healthy sheep. At the same time that this was done, I inoculated the animal in the usual way, making in all ten insertions. My object in employing both methods simultaneously was, that I might utilize the animal to the utmost. I was desirous on the one hand to induce a general infection, and thereby a general eruption; and on the other to obtain an additional supply of primary pustules for the completion of the investigations I had already made. I also thought it of great importance to compare the anatomical characters of the primary and secondary eruption in the same animal.

The injection and inoculation were performed on the 1st of April; the primary papules made their first appearance on the 4th. On the 7th,

several small secondary papules appeared on the lips and around the mouth, and increased rapidly in number during the succeeding three days. At the same time the eruption extended to other parts of the body, but the papules were most numerous in the axilla and on the belly. It is to be noted that the interval of time between the appearance of the first and last papules of the secondary eruption was considerable—so much so, that the pustules on the lips had already formed crusts at the time that the eruption was first visible in other parts. In this case, as in the others, the primary pustules were from half an inch to an inch and a-half in diameter; most of the secondary ones did not exceed a quarter of an inch, but there were a few of those which appeared latest on the chest and belly which measured half an inch or more.

*Microscopical characters of Sheep-pox Virus.**

Clear lymph, which had been kept for several days in a sealed capillary tube, was diluted with thoroughly boiled half per cent. saline solution. One portion of the diluted liquid having been reserved for further experimental inoculations, the remainder, which was intended for microscopical examination, was found to contain the structures represented in fig. 17.†

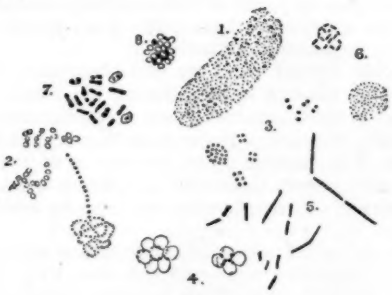

FIG. 17.

1. Transparent masses of various sizes, containing granules, some of which are small, pale, and indistinct, others large and shining.
2. Transparent spheroid bodies arranged in small groups composed of couples or necklace-like chains; each is bordered by a sharp line, as if consisting of transparent contents enclosed by a membrane.
3. Highly refractive micrococci grouped so as to form dumb-bells, or sarcina, or small colonies.
4. Groups of decolorised blood-corpuscles, with micrococci occupying the interstices between them.

* The description relates to a specimen of lymph sent by Prof. Cohn.
† The reference numbers on the figure correspond to those of the paragraphs.

5. Bacteria, of which the smaller ones correspond to *Bact. Termo* of Cohn.
6. Colonies of *Bacterium Termo.*
7. Micrococci mostly in couples or in small groups. Each spheroid is surrounded by a greenish envelope, or in some cases by what appears to be a thin membrane; the couples, in consequence of their being united by a transparent connecting substance, resemble rods with terminal swellings. These bodies are about twice the size of the micrococci referred to above.
8. Groups consisting of spheroids of two kinds, the larger corresponding with (2), the smaller with (3); on careful examination it is found that between the two kinds of bodies there are transitional forms, of which the characters are intermediate both as regards size and appearance. These groups appear to correspond to those figured by Cohn as microsphæra vaccinæ.

In the same preparation, after it had been kept at the temperature of incubation for twenty-four hours, the transparent masses referred to above (1), were found to have undergone the remarkable changes shown in fig. 18.

FIG. 18.

Under a high power it is seen that they consist of spherical granules of different sizes arranged in rows, each granule being united to its successor by pale transparent substance, so that the whole appears to be made up of a feltwork of delicate granular filaments, among which separate granules are seen here and there. In preparations kept for forty-eight hours the larger masses are seen to have broken up into smaller ones, in which the individual fibrils can be more easily traced, while the granules themselves have assumed characters which correspond to those of the micrococci (3), and pale spheroids (2) seen in the fresh lymph. This conversion of the granules contained in the masses into spheroids and micrococci goes on for some days, so that these bodies multiply very considerably in the liquid.

Examination of perfectly recent Lymph.

A drop of lymph obtained on March 24th, from a pustule of an animal that had been inoculated March 10th, was examined microscopically without dilution, and was found to contain, in addition to granular pus-corpuscles and coloured blood-corpuscles, numerous small highly refractive granules, either isolated or in couples, which exhibited molecular movement. After having been kept at 32° C. for twenty-seven hours, it

exhibited the following structures (fig. 19), in addition to those already mentioned :—

* 1. Pus-corpuscles, of which the substance has become swollen and transparent, each containing from two to six homogeneous slightly refractive spheroids. These bodies, of which the diameter is less than half that of a coloured blood-corpuscle, are also seen in considerable numbers in the free state ; they possess a slightly greenish colour, and are perfectly homogeneous, differing in both of these respects from nuclei of pus-corpuscles. When not enclosed in pus-corpuscles, they occur either isolated or in couples ; in form they are usually spheroidal, but are occasionally

FIG. 19.

oblong, showing a more or less marked constriction in the middle. Along with these, other forms exist, in which it can be made out that the body, if a spheroid, consists of a highly refractive smaller granule (micrococcus) contained in a transparent envelope ; or if oval or rod-like, of two such granules held together in a similar manner. Between these and the free micrococci to be immediately described, it is easy to observe the transition.

2. By the repeated division of the spheroids above described, the dumb-bells and necklaces shown in the figure † are formed ; the constituent micrococci of the necklaces are held together by a connecting transparent substance. Sometimes they are all of the same size, but more frequently one is larger than the rest, and

* The numbering of the paragraphs corresponds as before, to that of the fig. (19).

† The particles forming the necklaces present the appearance of solid bodies ; this is not well shown in the engraving.

presents the appearance of a greenish transparent pear-shaped body, which may or may not contain a highly refractive granule. The necklaces, which have grown to a great length, and have become much convoluted, are apt to break up into shorter chains, forming

3. Groups from which the free ends of the filaments project. By the coalescence of these groups of convoluted chains, colonies, consisting of micrococci closely packed together, are produced, which correspond in appearance to the Zooglæa of Cohn; these colonies are often connected together by

4. Long filaments, some of which still show a necklace-like structure, while others are apparently smooth and homogeneous. Twenty-four hours later the colonies were found to have increased in number and size; some of the individual micrococci had also undergone changes, having not only acquired larger dimensions, but having assumed the appearance represented in fig. 17 (7).

From the appearance above described, I conclude that the highly refractive spheroid is the only form that can be regarded as characteristic of the lymph of Sheep-pox in its active condition.

Anatomical Investigation of the Changes which occur at the Seat of Inoculation.

1. The development of the primary pock may be divided into three stages, of which the first is characterised by progressive thickening of the integument over a rapidly increasing but well-defined area; the second, by the formation in the rete Malpighii of vesicular cavities containing clear liquid (the "cells" of older authors), in which sooner or later organic vegetable forms are developed; the third, by the impletion of these cavities with pus-corpuscles. It is to be noted that the division into stages is less marked than in human Small-pox.

2. The process commences in the rete Malpighii and in the subjacent papillary layer of the corium—in the former, by the enlargement and increased distinctness of outline of the cells, and by corresponding germinative changes in their nuclei; in the latter, by the increase of size of the papillæ, and by germination of the endothelial elements of the capillary blood-vessels.

3. It is next seen that the interfascicular channels (lymphatic canaliculi) of the corium are dilated and more distinct; that the lining cells of these channels are enlarged and more easily recognised than in the natural state; and that in the more vascular parts of the corium the channels are more or less filled with migratory or lymph corpuscles. At the same time the lymphatic vessels, of which the canaliculi are tributaries, can be readily traced, in consequence of their being distended with a material which resembles coagulated plasma.

4. About the third day after the appearance of the pock, the contents of the dilated lymphatics begin to exhibit characters which are not met with in ordinary exudative processes. These consist in the appearance, in the granular material already mentioned, of organised bodies, which

neither belong to the tissue, nor are referable to any anatomical type—viz., of spheroidal or ovoid bodies having the characters of micrococci and of branched filaments. In fig. 20, a lymphatic vessel of the corium

FIG. 20.

is seen in section, filled more or less completely with micrococci. In some parts the spheroids are aggregated in the zooglæa form, so that the mass appears granular; in others it presents a filamentous aspect, the

spheroids being in necklaces or chaplets. In the upper part of the figure a blood-vessel (*c*) is shown in section, which is sheathed in the lymphatic channel; at *d* a valve is shown, with masses of micrococci on either side of it; *b b* indicate interfascicular channels containing connective-tissue corpuscles. In fig. 21, a similar lymphatic vessel of the corium is represented, of which the contents have the characters of a mycelium, and consist of branched filaments. In fig. 22, the same

FIG. 21.

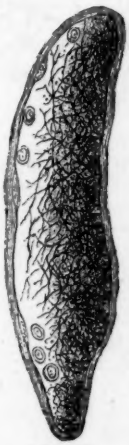

FIG. 22.

structure is seen, but the interlacing of the filaments is so dense that the whole presents the aspect of a felt-like mass.

5. The process thus commenced makes rapid progress. After one or two days, the greater number of the lymphatics of the affected part of the corium become filled with the vegetation above described; and on careful examination of the masses it is seen that they present the characters of a mycelium, from which necklace-like terminal filaments spring, each of which breaks off at its free end, into conidia. In most of the filaments a jointed structure can be made out, and in the larger ones the contents can be distinguished from the enclosing membrane by their yellowish-green colour.

The necklace-like filaments are well seen in fig. 23. They are contained in a lymphatic vessel of the corium similar to those represented in figs. 20, 21, and 22.

Separated conidia, in a state of germination, are shown in fig. 24, as seen under a much higher power.

6. At the same time that these appearances present themselves in

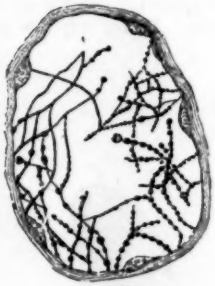

FIG. 23.

FIG. 24.

the corium, those changes are beginning in the now much thickened rete Malpighii, which are preparatory to the formation of the vesicular cavities already mentioned. By a process which I propose to designate "horny transformation," having its seat in the epithelial cells of the middle layer of the rete Malpighii, a horny expansion or stratum appears, lying in a plane parallel to the surface, by which the rete Malpighii is divided into two parts, of which one is more superficial, the other deeper than the horny layer. Simultaneously with the formation of the horny layer, the cells of the rete nearest the surface of the corium undergo very active germination, in consequence of which the interpapillary processes not only enlarge, but intrude in an irregular manner into the subjacent corium. At the same time the cells immediately below the horny stratum begin to take part in the formation of the vesicular cavities, some of them enlarging into vesicles, while others become flattened and scaly, so as to form the septa by which the vesicular cavities are separated from each other.

The whole of this process is well shown in fig. 25, which represents a vertical section through the central portion of a primary pock on the eighth day.

The stratum corneum is unaltered. The newly-formed horny layer by which the rete Malpighii is abnormally split into a superficial and a deep layer, is seen to be formed by the transformation of the cells which lie next to it on its superficial aspect. On its deep surface are cells which are much enlarged and contain vacuoles; they present the appearance to which pathological histologists frequently apply the term dropsical. It is by the subsequent dilatation of these enlarged cells that the vesicular cavities ("cell" of the older authors) are formed; between them the septa are seen composed of flattened and scaly cells which, as above described, extend from the horny layer towards the interpapillary

processes. The drawing further shows the remarkable changes which take place in the papillary processes themselves simultaneously with the formation of the horny layer. In consequence of the very active

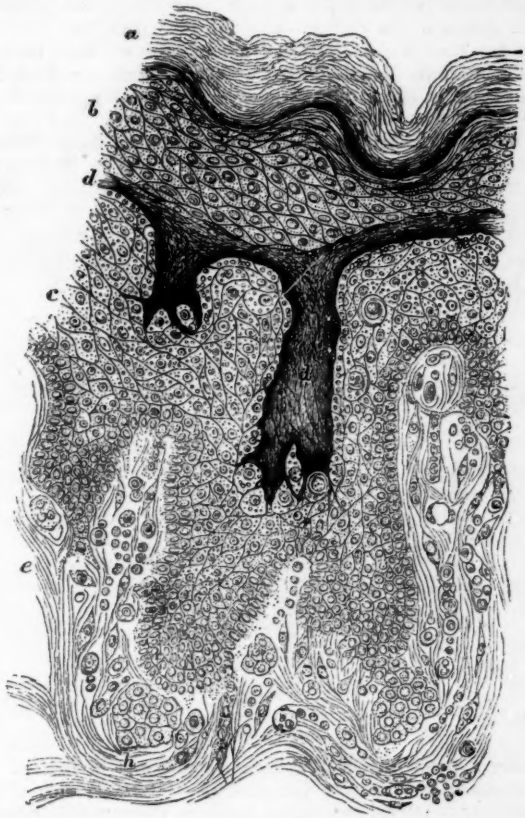

FIG. 25.

a Stratum corneum, *b* superficial layer of *rete Malpighii*, *c* deep layer of ditto, *d* newly-formed horny layer, *e* superficial or papillary layer of corium.

germination of the cells of which these processes consist, they send down conical or cylindrical sprouts into the corium; it sometimes happens that the end of one of these sprouts is cut off, so that it presents itself in the section as an island of cells (*h*) surrounded by the tissue of the corium.

7. The vesicles, once formed, increase in size and number. Originally separate, and containing only clear liquid, they coalesce, as they get larger, into irregular sinuses, and are then seen to contain masses of vegetation similar to those which have been already described in the lymphatic system of the corium—with this difference, that the filaments of which the masses are composed are of such extreme tenuity, and the conidia are so small and numerous, that the whole possesses the characters of zooglæa rather than of mycelium. There appears to me to be little doubt that these aggregations are produced in the same way as the others; viz., by the detachment of conidia from the ends of filaments. The characters of the vegetation contained in the vesicular cavities are well shown in fig. 26. The contents of a single vesicle, as

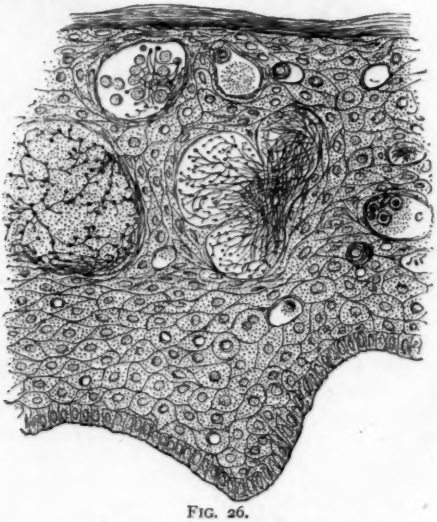

FIG. 26.

seen under a much higher power, are represented in fig. 27. In the earlier stages of the process the cavities contain scarcely any young cells. Sooner or later, however, so much of the rete Malpighii as lies between the horny stratum and the papillæ becomes infiltrated with migratory lymph-corpuscles. The process can be plainly traced in the sections. At the period of vesiculation, *i.e.*, at a time corresponding to the commencement of the development of the vesicles in the rete Malpighii, the cutis (particularly towards the periphery of the pock) is infiltrated with these bodies. No sooner has the coalescence of the vesicles made such progress as to give rise to the formation of a system of intercommunicating sinuses, than it is seen that the whole of the deep layers of the rete Malpighii become inundated (so to speak) with

migratory cells, which soon find their way towards the cavities, and convert them into microscopical collections of pus-corpuscles, the formation of which is proved to be due to migration from the corium,

FIG. 27.

not only by the actual observation of numerous amœboid cells *in transitu*, but by the fact that the corium itself, before so crowded with these bodies, becomes, as the pustulation advances, entirely free from them.

Anatomical Investigation of the General Eruption.

The anatomical characters of the secondary pocks are substantially the same as those of the primary, the most prominent features being thickening of the rete Malpighii and œdema of the corium, combined with the presence of lymph-corpuscles around the blood-vessels, with similar corpuscular infiltration of the lymphatic canalicular system in the neighbourhood.

In general, the stage of pustulation is reached more rapidly in the secondary pustules than in those which are the direct result of inoculation. Thus, in the eruption on the lips, the contents of the vesicular cavities became purulent not later than the third or fourth day; after the appearance of papules on the chest, the development was more tardy. The infiltration of the cutis and papillary tissue was greater towards the periphery than towards the centre, especially in those pustules that had lasted longest and exhibited most distinctly a central depression. There were also considerable differences as regards the changes which, in the primary pustule, result in the splitting of the rete Malpighii into two layers. The peculiar transformation which, in the primary pustule, goes on to such an extent as to result in the formation of a horny layer, which is of such thickness and so well marked that it can be distinguished in the section by the naked eye, is represented in the secondary pustules by a change of the same kind, which, how-

ever, is very partial in its extent and distribution, and affects only a few cells of the middle layer of the rete. Connected with this, there is a considerable difference in the mode of the formation and the arrangement of the vesicular cavities. They appear in great number simultaneously in the middle layers of the rete Malpighii, and are generally found much nearer the corium than in the primary pocks. It is further to be noticed as a collateral fact, that in consequence of the number and progressive dilatation of the vesicles at the expense of the deepest layers of the rete, the inter-papillary processes become obliterated, so that the corium is marked off from the rete by a line which is almost as even as it is in sections of the natural skin. As a further result of the distinction of the vesicles, it is sometimes seen that the deepest cells of the rete are altered in form by compression. As regards the distribution of the vesicles in the secondary pustule, it is to be noticed that even in those pocks that exhibited a marked central depression, the most numerous and well-developed vesicles were found towards the centre; this is clearly inconsistent with the supposition that the depression is caused by the disappearance of previously existing vesicles.

As has been already stated, the vegetations contained in the lymphatics of the corium, as well as those occupying the vesicular cavities, presented the same characters as those which have been already described in the previous section. In some vesicles the mycelium is embedded in a finely granular matrix which is to be regarded as coagulated plasma; in others the matrix is almost homogeneous, and is stained slightly by carmine and hæmatoxyline. The mycelium itself, as well as the spores which devolve from it, exhibit a bright and shining appearance. Eventually the mycelium is transformed by a process of rapid fructification into a mass of micrococcus resembling zooglæa, the characters of which are not to be distinguished from those of the similar masses which are met with in the primary pustules when examined at a later stage of their development.

REFLEX PARALYSIS OF VESSELS, AND OTHER LESIONS DUE TO SUPPRESSION OF THE CUTANEOUS EXHALATIONS.

BY FEINBERG.

(*Archiv f. Pathol. Anatom. und Physiol.*)

In a series of experiments made on animals by varnishing their skin, Feinberg has made a study of the morbid phenomena succeeding the suppression of the perspiration and cutaneous exhalations, and gives us the following results of his researches :—

I. *Symptoms.*—1. Cutaneous hyperæsthesia was remarked in all the animals experimented upon.

2. Reflex excitability was increased in proportion to the degree of hyperæsthesia.

3. Trembling was an initial symptom, which continued sometimes until death occurred.

4. The immobility of the animals was constant, and partly produced by the mechanical impediment to muscular activity, and partly also by the sanguineous extravasations in the spinal cord and muscles.

5. Convulsions were rarely absent, coming on in paroxysms, and usually assuming the tetanic form.

6. As a rule, a day before death there was incomplete paralysis, especially of the posterior half of the body. Paralysis of the bladder was frequent, and was accompanied by incontinence of urine.

7. The respiration diminished, and the heart's action became gradually feeble.

8. The temperature was variable, according as the animals were enveloped in a good or bad conductor of heat. In the first instance, the temperature in the rectum sometimes fell to 20° or 19° Cent. (68°, 66·2° Fahr.); in the second it ascended above the normal temperature, and remained there until shortly before death, when it descended more or less rapidly.

9. There was an absence of appetite and thirst; the fæces were normal, but often passed involuntarily.

II. *Anatomo-pathological lesions.*—The following is a summary of the alterations observed. Dilatation of all the subcutaneous vessels, enormous distension of the pulmonary capillaries, and frequently subpleural hæmorrhage. Repletion of the heart's cavities with blood, and hæmorrhage into the texture of the organ. Very great dilatation of the branches of the vena portæ, and sanguineous extravasations in the liver and mucous membrane of the stomach. Catarrh of the intestinal mucous membrane, and hyperæmia and parenchymatous inflammation of the kidneys. Catarrh of the mucous membrane of the bladder. Capillary dilatation and hæmorrhagic extravasations in the peripheral nerves and striped muscles, with injection of the meninges of the brain. Intense congestion of the grey substance of the dorsal and lumbar portion of the spinal cord; and, histologically, dilatation of the capillaries and capillary hæmorrhage, with destruction of the nerve substance. In many cases there was intense proliferation of the neuroglia in the spinal cord.

PUTREFIED BLOOD.

BY FELTZ.

(*Comptes Rendus*, May 1875.)

FELTZ has been conducting a series of experiments on the poisonous action of putrefied blood. He found that dogs in whose crural vein he injected blood which had putrefied and reached a stage in which bacteria and allied organisms disappeared, exhibited loss of appetite, vomiting, bilious diarrhœa, and other bad symptoms. Four out of six died, but not until ten or twelve days had elapsed. In another set of experiments, he employed the powder of old putrefied and dried blood mixed with water. Two out of three dogs died; and, as in the former case, their blood showed septikæmic characters, with deformation of the red corpuscles. The bacteria, etc., present in these cases appear to have developed from germs that had survived the putrefaction and desiccation.

RABIES IN THE PIG.

BY HARTMANN.

(*Œsterreiche Vierteljahresschrift fur Wiss. Thierheilkunde.*)

HARTMANN, Veterinary Surgeon at the Hungarian Stud at Mezöhegges, reports a number of cases of transmitted Rabies in the pig, and sums up the conclusions to be derived from his observations in the following terms: 1. The period of incubation of Rabies, variable in these different cases, was twenty-one days in the first, twenty-six days in the second, thirty-five days in the

third, and fifty-three days in the fourth. 2. The duration of the malady rarely exceeded one day. 3. The different stages of the disease succeeded each other rapidly, and without any well-defined periods. 4. The paralytic stage supervened soon after the commencement of the symptoms, and the paroxysms diminished as the exhaustion and paralysis increased. 5. Young pigs have fed on the milk of rabid sows, and licked the saliva and foam which flowed from the mouth of the latter, without suffering any inconvenience. 6. The attempts made to transmit the disease from one pig to another by bites, and by the inoculation of the blood and saliva from rabid animals, have proved negative in their results. 7. At the autopsy of animals which had perished from the disease, no special lesions were observed.

Abstract of the Proceedings of Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING, *July 14th*, 1875.

COLONEL SIR F. FITZ WYGRAM, Bart., President, in the chair.

Present: Messrs. Dray, Moon, Withers, Field, Gowing, Balls, Broad, Harpley, Greaves, Lawson, Lepper, Cox, Cartwright, and the Secretary.

The minutes of the two last special meetings were read and confirmed.

Letters were read:—1. From Professor McCall, Mr. Mayer, Mr. Cartwright, Mr. Lepper, and Mr. Withers, acknowledging the honour of their election as Vice-Presidents. Mr. Withers also acknowledged the honour of his re-election as treasurer. 2. From Dr. Burdon Sanderson, acknowledging the honour of his election as a member of the Board of Examiners. 3. From Dr. Taylor, approving the election of Dr. Sanderson. 4. From Mr. Burley, of Leicester, conveying his thanks to the Council for the resolution passed at the last meeting relative to his deceased father.

The SECRETARY handed in a copy of a pamphlet on "Drinking Water," presented by the author, Professor Voelcker.

On the motion of Mr. DRAY, seconded by Mr. GREAVES, the thanks of the Council were voted to Professor Voelcker.

A letter was read from Mr. Fleming, regretting his absence from the meeting of the Council, presenting a copy of the new *Veterinary Journal*, and requesting to be furnished with abstracts of the proceedings of the Council for publication in the journal.

Mr. BROAD proposed, and Mr. GOWING seconded, a vote of thanks to Mr. Fleming for his gift.

This was agreed to.

Mr. HARPLEY proposed that Mr. Fleming's request be complied with. This was seconded by Mr. GOWING, and agreed to.

The REGISTRAR reported that 250 copies of the new register had been received from the printers.

Letters were announced as having been received from the Deputy Clerk of the Peace, St. Albans; from Mr. Hill, of Wolverhampton; Mr. Worsley, of Bolton; and Mr. Simpson, of Maidenhead.

Mr. BROAD proposed the re-election of Mr. Coates as Registrar for the ensuing year.

Mr. BALLS seconded the motion.

On a ballot being taken, Mr. Coates was declared to be unanimously re-elected.

The following committees for the year were then appointed :—

Finance Committee.

Mr. J. C. Broad	Mr. Harpley	Mr. Balls
Mr. Field	Mr. Moon	Mr. Withers

Publication Committee.

Prof. Brown	Mr. Fleming	Mr. J. R. Cox

College Fund Committee.

Prof. Brown	Mr. Field	Mr. Mayer
Mr. Balls	Mr. Gowing	Mr. Withers
Mr. J. C. Broad	Mr. Harpley	

Parliamentary Committee, with power to add to their number.

Prof. Simonds	Mr. Fleming	Mr. Wilkinson
Mr. J. C. Broad	Mr. Gowing	Mr. Cox
Mr. Field	Mr. Harpley	

Library Committee.

Prof. Axe	Mr. Harpley	Mr. Dray

The REGISTRAR read the obituary notice.

Letters were announced as having been received from the Principal of the Royal Veterinary College, and from the members of the Board of Examiners, approving of the time selected for holding the examinations.

The SECRETARY read the results of the first and pass examinations recently held in London.

A letter was read from Dr. Dunsmure, stating that the probable number of students who will offer themselves for the minor examination will be :—Veterinary College, Edinburgh, 10 ; New Veterinary College, Edinburgh, 14 ; Glasgow, 20. The examinations to commence in Edinburgh on the 20th inst., and in Glasgow on the 22nd.

A letter was also read from Professor Walley, enclosing another from Mr. Edward Lewes, formerly of Budworth, Cheshire, and now of St. Louis, N.S., stating that in travelling in America he had lost his diploma, and asking how he could obtain a duplicate copy.

The SECRETARY was directed to write to Professor Walley or Dr. Young, of Edinburgh, for an authentication of Mr. Lewis's handwriting, and if the answer was satisfactory, to send him a certificate in the form adopted on previous ocasions.

The SECRETARY read the report of the College Fund Committee. It stated that since the last meeting of the Council circulars had been issued to the members of the profession throughout the United Kingdom, soliciting subscriptions. The sum of £35 had been received and paid into the bank during the past month, leaving a balance of £92 11*s.* 7*d.* £10 had just been received from Mr. John Lawson, Manchester, and subscriptions promised, but not yet received, amounted to £53 12*s.*

Mr. DRAY moved the adoption of the report.

Mr. MOON seconded the motion, which was agreed to.

The SECRETARY read the Report of the Finance Committee, including the Treasurer's Balance Sheet. The present liabilities amounted to £131 19*s.* 3½*d.*, and the balance at the bank was £519 17*s.* 1*d.*

Mr. COX asked if the cost of the examinations exceeded the receipts from the pupils.

Mr. HARPLEY said that at the April examination the Scotch schools had

not a full number of students, and the result was that there was a great loss to the College.

Mr. DRAY asked what the liabilities were to the parliamentary agents.

The SECRETARY said that was a running account which had not been sent in.

The PRESIDENT thought that the accounts should always contain an estimate of such liabilities, which might be easily obtained.

On the motion of Mr. GOWING, seconded by Mr. CARTWRIGHT, the report and the quarterly balance-sheet were received and adopted.

The correspondence that had taken place relating to the new Charter of the Royal Veterinary College was read, and on the motion of Mr. HARPLEY, seconded by J. C. BROAD, was ordered to be entered on the minutes.

Referring to Messrs. Wilkinson's complaint, that imputations had been cast upon them on account of their actions in this matter,

The PRESIDENT said he had had an interview with Messrs. Wilkinson, and explained to them that at the meeting of the Council nothing was said which could in the least degree bear the construction of imputation against them. Of course, the Council were not responsible for anything which members might have said in their private capacity.

The SECRETARY was directed to write to Messrs. Wilkinson, stating that no imputations of any kind had been cast upon them at the Council meeting.

Mr. DRAY said the correspondence that had been read entirely justified the observations he made at the annual meeting, when he stated, on the authority of the representations from the Parliamentary agents, that the clauses about which so much discussion had taken place, had been inserted in the Charter.

Mr. HARPLEY, in pursuance of notice sent to the Secretary on the 3rd June, that at the next Council meeting he would "call the attention of the members to the question as to the solicitor to the College, and move a resolution," said he was sorry to find that that notice had been interpreted to mean an intention on his part to move for the appointment of a new solicitor. He merely wished to "call attention" to the subject; but one member of the Council, misunderstanding the object of the notice, had issued a circular letter to the other members, asking them to give their votes for another gentleman in Mr. Wilkinson's place. Mr. Wilkinson had not resigned, and the Council were not likely to pass a resolution summarily dismissing him from the position he had held for so many years as legal adviser of the Council. Recent occurrences had rendered it incompatible for the same solicitor to hold the two appointments of legal adviser both to the R.C.V.S. and the Royal Veterinary College. So far back as last November he had proposed that the President and Secretary should wait upon Mr. Wilkinson, and ask him if he thought, from his position as joint-solicitor, he could advise the Council with regard to the proposed Charter. That motion was seconded by Mr. Fleming and carried, but did not appear to have been acted upon, and in fact no record of it was entered upon the minutes. Had Mr. Wilkinson been spoken to then, the subsequent difficulties might have been avoided. He had no complaint whatever to make against Messrs. Wilkinson in their professional capacity; they were most talented men, standing very high in their profession, and when he was President they displayed the utmost care and interest in all matters upon which the Council had to consult them; but he considered the time was come when some such resolution as that which he now proposed should be agreed to: "That recent events having proved to this Council that it is inexpedient to employ the same legal adviser as the Royal Veterinary College, the President be requested to call on Messrs. Wilkinson and Son, and point out to them the difficulty the Council found themselves in, when the Charter recently granted to the Royal Veterinary

College was under consideration, by reason of their being unable to obtain their solicitor's opinion on the Charter, and to suggest to Messrs. Wilkinson the advisability of their resigning either their connection with the Royal College of Veterinary Surgeons or with the Royal Veterinary College."

Mr. WITHERS said he had no hesitation in avowing himself as the author of the circular which Mr. Harpley had alluded to, and he thought there was no impropriety in what he had done.

Mr. FIELD seconded Mr. Harpley's resolution, which was agreed to.

The SECRETARY suggested that a new Bye-Law should be framed, fixing the minimum number of students which might be examined at one time. On the 17th April, he said, there was at one Examination only four students for the Pass Examination at the Glasgow Veterinary College, and four for the First Examination. The consequence was that the expenses exceeded the receipts in Scotland by £68. For the ensuing Examinations there will be twenty students from Glasgow, thus making an overplus of two, and in Edinburgh there would also be too small a number. It had formerly been arranged that in such cases the odd number should be transferred from one place to the other. In one or two cases that agreement had been acted upon, and the Council had paid the travelling expenses of the students from Glasgow to Edinburgh, or *vice versâ*. The Royal Veterinary College had arranged their students so as to form a full number, or very nearly so, on every occasion.

Mr. GREAVES asked what number of students would recoup the expense of calling a Board.

The SECRETARY said not less than six would be required.

The PRESIDENT said there were several courses which might be pursued, and he therefore moved that a Committee should be appointed to report on the excessive cost of the Scotch Examinations, and to suggest the best means of remedying the evil.

Mr. FIELD seconded the motion, which was agreed to.

On the motion of Mr. DRAY, seconded by Mr. GOWING, the following gentlemen were appointed to form the Committee: Messrs. Harpley, J. C. Broad, and Cox.

The PRESIDENT proposed: "That a Committee be appointed to consult with the Principals of the Schools, and report on the advisability, or otherwise, of adopting two instead of three Examinations in the year, and also to fix the best time for holding the Examinations." The first object of the motion, he said, was to prevent the course of instruction in the schools from being interrupted by the necessity of working up a certain number of students to pass their examinations, whilst the others were continuing their ordinary lessons. His second object was, as far as possible, to compel all the students to join at one time of the year. If a student joined a school at an intermediate period, he must necessarily lose the thread of the instruction which had been given to those who had attended the whole session. In the spring of the present year he was at Edinburgh, and was rather amused to find that the Scotch Schools wished to have only two Examinations, because about four years ago, when Professor Simonds wished to have only two Examinations, Professor Williams had pressed so strongly for three, that the point was conceded at his request. When he returned to London, however, he found that Professor Simonds had also changed his mind, and now thought it best to have three. If the proposal to have only two Examinations were strongly opposed by the London School, it would be unfair to carry it, as that was the largest School, more especially as no representative of the Royal Veterinary College was then present at the Council meeting. He proposed his motion rather in the interest of the Schools than of the College, for the three Examinations put too great a burden upon the teachers.

Mr. HARPLEY seconded the motion, which was agreed to.

The PRESIDENT next proposed the motion of which he had given notice, for awarding certificates of merit to the most distinguished students at the Pass Examinations. He thought it would afford a stimulus to study, and he had ascertained from Mr. Lock, the Parliamentary Agent, that there was nothing in the Charter to prevent the granting of such certificates. One objection which had been advanced to the proposal was, that it was invidious to make any distinction between one student and another, but he thought an undue regard to the interests of the idlers would not tend to the advancement of the profession. It had been said that the inferior schools might suffer by the certificates of merit, but he thought that would be rather a benefit than an evil. The establishment of such certificates would greatly lighten the labours of the teachers, by supplying to the students an additional and most powerful motive to exertion.

Mr. J. C. BROAD seconded the motion.

Mr. GOWING thought the Council should know the form of the certificates which it was proposed to grant before they voted upon this question.

The PRESIDENT said it would be desirable to state at the foot of the certificates, that they had only been granted since 1875. This was necessary in the interests of those who had already obtained their diplomas.

Mr. COX said he had some misgiving as to the wisdom of the policy of granting special certificates of merit. Would it not be preferable to regard the diploma itself as the certificate of merit, and to consider that those who could not secure such a certificate were not deserving of the diploma at all?

Mr. GOWING thought such certificates would work badly, and create unpleasantness among members of the College residing in the same town or district.

Mr. GREAVES thought it was right to give encouragement to students to make themselves thorough masters of their profession. It was an injustice to the clever and talented student to leave him on a level with one who had but just managed to obtain his diploma.

Mr. DRAY approved of the motion.

The PRESIDENT said, that in order to secure the approbation of the Council, he was prepared to alter his motion as follows: "That the Examiners for the Final Examination be directed to report to the Council the names of students who have passed with very great credit, and also the names of students who have passed with great credit; that the lists so furnished by the Examiners be entered on the Minutes of the Council, and that copies of the list be furnished to students on application, and sent for publication to the professional journals."

Mr. GOWING much preferred the motion in its altered form.

Mr. DRAY seconded the motion as now proposed.

The motion was agreed to.

On the motion of the PRESIDENT, seconded by Mr. DRAY, the following alteration in Bye-Law 31 was ordered to be suspended till the next meeting: Instead of the present words, to read, "That no student be eligible for the second or final Examination until he has attended one full winter and one summer session after passing his first Examination."

An application from Mr. Kennet, who had failed three times to pass the first Examination, to be allowed to attend a fourth time, was considered, but rejected.

Mr. COX (who was not present when the Publication Committee were appointed) asked that the Committee might have some sort of direction as to their mode of procedure in the future. During the past year they had been made the scapegoats for some omissions in the publication of reports,

and he wished to know if the Council would approve of the shorthand writer's notes being published *in extenso*.

On the motion of the PRESIDENT, seconded by Mr. GREAVES, it was agreed, "That the shorthand writer's notes be placed at the disposal of the two professional journals."

Mr. GREAVES said he had been asked by Mr. John Lawson, who had been compelled to leave the meeting, to express his thanks to the Council for electing him a Vice-President.

The proceedings then terminated.

ROYAL COLLEGE OF VETERINARY SURGEONS' EXAMINATIONS.

AT a Meeting of the Court of Examiners of the Royal College of Veterinary Surgeons, held July 1st, the following students from the Royal Veterinary College, London, received the diploma of the College, and were admitted members of the profession.

July 1st.

Mr. Charles Gresswell, South Lincolnshire.
" George Garnett, London.
" Charles Mullett Stapley, St. Leonards-on-Sea.
" George South, junr., London.
" William Henry Jones, Brompton Barracks, Chatham.
" Thos. William Whitney, Tiverton, Devon.
" David Morris Storrar, Chester.

STUDENTS WHO HAVE PASSED THEIR FIRST EXAMINATION.

At the several meetings of the Court of Examiners of the Royal College of Veterinary Surgeons, held on July 2nd, 3rd, 5th, 6th, 7th, and 8th, the following students from the Royal Veterinary College passed their "First Examination."

July 2nd.

Mr. Thomas Sidney Barker.
" John Henry Miller.
Mr. Wm. Hollingsworth Hall.
" George Whitworth.

July 3rd.

Mr. Samuel Alexander Reid.
" Tom Goulstone Batt
" Joshua Arthur Nunn.
" Thomas James Marriott.
Mr. William Coupe.
" Charles Hartley Thomas.
" Wright Graves.
" Herbert Darley.

July 5th.

Mr. Alfred Brookes.
" Francis Waters Phelan.
" John Henry Bryars.
" Henry Goulè.
Mr. Albert Wheatley.
" George Amos Banham.
" William Awde.

July 6th.

Mr. Thomas Sager Faulkner.
" Thomas Robert Prime.
" William Mole.
Mr. Frederick George Reynolds.
" Henry Moore.
" William Francis Peacock.

July 7th.

Mr. Myrus Child Yaxley.
" John Cooper.
Mr. Arthur Wilberforce Mason.
" James Moore.

July 8th.

Mr. John Thompson Fraser.
" John Fawthrop Fyrth.
" Alexander Braik Daniel.
" Jonas Squire.
Mr. Frederick Cann.
" James Joseph Williams.
" John Griffiths Cattrall.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

THE monthly Council Meeting of the Royal Agricultural Society was held on June 30th, when forty-seven new members were elected. The Chairman of the Veterinary Committee, the Hon. Wilbraham Egerton, M.P., brought an important correspondence with the Veterinary College before the Council. A conference has been held between the authorities of the Veterinary College and the Royal Agricultural Society as to their future relationship, and the extent to which the services of the Principal of the College may be employed by the Royal Agricultural Society. At the conference Mr. Newdegate, M.P., and Professor Simonds represented the College; Mr. Egerton, M.P., Mr. Wells, and the Secretary represented the Society. The College decided, among other things, that it could no longer permit Professor Simonds to act as Veterinary Inspector to the Society; and that it could only guarantee to give half-yearly instead of quarterly reports. The conference also related to other matters of a more detailed character.

The Veterinary Committee of the Royal Agricultural Society were of opinion that the proposals of the Royal Veterinary College do not sufficiently meet the requirements of the Society, and they, therefore, recommend that from and after Dec. 31st, 1875, the grant to the Royal Veterinary College be discontinued, and that a notice to that effect be given to the Governors of the Royal Veterinary College. The Committee further recommend that the grant for veterinary purposes should be devoted—

1st. To giving members of the Society the opportunity of obtaining the best veterinary advice in the case of any extensive or serious outbreak of disease.

2nd. To provide for experiments being made in the treatment of diseases.

3rd. To the scientific investigation of the causes and nature of diseases belonging to the farm.

The Committee hope to be able to submit in the autumn a scheme which shall carry out these objects.

In moving the adoption of the report, Mr. Egerton said that since the establishment of the Veterinary Department of the Privy Council the Society had not been dependent upon the College for such information as was furnished in the reports of the governors, who treated the information they received from veterinary surgeons throughout the kingdom as confidential, and not to be communicated to the Society. It also appeared that the Council could not have the services of Professor Simonds as Veterinary Inspector; and although they might employ other professors, it must be as one of the public, and as a matter of the Professor's private practice. He thought that the time had come when the Society should do something for veterinary science, and it seems that there was a wide field open, although, with regard to the ordinary investigation of disease as a matter of veterinary practice, Professor Simonds was of opinion that there was nothing more to be done. The higher class of investigations as to the causes of disease cannot be carried out in the midst of practice, but require special appliances, and he thought that the Council ought specially to encourage such investigations. The Royal Veterinary College appeared to devote attention almost entirely to horses, and the Privy Council would not devote its money to the furtherance of scientific investigation, although the concurrent testimony of Dr. Williams and Professor Ferguson showed that investigations into Pleuro-pneumonia were of the utmost importance at the present moment.

The report was adopted, and though the President expressed his regret at the severance of the connection between the College and the Society, he

thought that, looking at all the circumstances, the conclusion was a wise one.

In alluding to the above conclusions of the Royal Agricultural Society, *Bell's Life* of the 10th July makes the following comments :—

"We quite agree with all that Mr. Egerton said, as, no doubt, agriculturists will generally; and we believe that now Mr. Egerton has once stirred up the Veterinary Committee to activity, and that the Society is about to act on its own responsibility, as it were, in veterinary matters, a vast deal of good may be done. In our own connection with farms and farming stock, now extending over many years, and under many circumstances, we have formed a very decided opinion that the generality of veterinary practitioners, we mean regular members of the Royal Veterinary College, know very little about the pathology of cattle; they all prefer to treat horses. Whether it is that they look upon horses as the superior animals, and that cows are a little beneath their serious notice, or whether it is the teaching they have received at the Veterinary College, we cannot tell; but of this we are sure, that many men who are most clever in treating the diseases of horses, and even of dogs, are complete muffs when they are called in to a difficult case of a cow. So firmly fixed is this belief, that, as we have already said before in our 'Farming Notes,' we have doctored our own cows ourselves for many years, because we generally found that we knew quite as much about them as the veterinary surgeons did. Not so with horses. During the same period we have almost invariably called in a veterinary surgeon, because we felt that, generally speaking, we were in good and skilful hands. We are convinced that if during the last forty or fifty years there had been as much attention bestowed on the diseases of cattle as had been given to the diseases of horses, at the Veterinary College and elsewhere, we should not have lost anything like the number of cattle we did during the cattle-plague; but we should in all probability have had practitioners who were at any rate able to point out the cause, even if they could not find a remedy for the mysterious scourge."

Notes and News.

HONOURS TO VETERINARY PROFESSORS.—Professor Franck, of the Munich Veterinary School, has been named a Chevalier of the first class in the Order of Merit of Saint Michael; and Professor Zürn, of Leipsic, has received the Cross of the second class of the Order of Saint Stanislaus.

AMERICAN HOGS.—The Agricultural Department at Washington has obtained statistics from the principal hog-bearing States, showing that in January last there were 3,398,200 hogs on the hoof in Iowa, 2,670,000 in Indiana, 2,082,600 in Missouri, 2,034,600 in Illinois, above 1,700,000 in each of the States of Ohio and Kentucky, and nearly 600,000 in Wisconsin. It was estimated that the returns from other States would make the hog crop of the United States exceed 18,000,000 this year.

INFLUENZA AT BARNSLEY, YORKSHIRE.—Owing to a serious outbreak of influenza amongst the horses and ponies employed underground, the old East Gawber Hall Colliery has had to be entirely set down. Six horses have already died, and about fifty animals have been drawn out and placed in stables on the surface, under care of two veterinary surgeons. About four hundred men and boys are thrown out of employment.

POTTED HAY.—Mr. Wrightson, of the Cirencester Agricultural College, writes to the *Times* regarding "sour hay," as follows: Will you allow me a few lines' space to call attention at this seasonable time of the year to a process of preserving fodder for winter use little known, and, so far as I am aware, never practised in this country? It gives as its product what is known all over the Austrian Empire as sour hay, which, I may add, I have seen used extensively on many large estates. The process of making sour hay is not only exceedingly simple, but, in the event of a wet season, might be adopted in this humid climate with excellent effects, as neither drying winds nor sun are required. The green grass, green Indian corn, or other fodder is simply crammed down into graves or trenches 4ft. wide and 6ft. to 8ft. feet deep, until it forms a compact mass up to the surface, and the whole is then covered with a foot, or rather more, of earth, rounded over, so as to form a long mound. No salt is used, and the wetter the fodder goes the better. The preservation is complete, and when cut out with a hay spade in winter, the fodder is of a rich brown colour, and exhales a slightly sour, but, on the whole, agreeable flavour. I beg to enclose you a sample made from green maize which I obtained in 1873, while travelling in Hungary for the Royal Agricultural Society.

THE "REPERTORIUM FÜR THIERHEILKUNDE."—Professor Hering, who for thirty-five years has conducted this journal, and furnished a large portion of the important and always interesting matter it has contained during that long period, has retired from an active share in its affairs. He intends, nevertheless, to afford assistance and advice to those who are to continue it; and this will, to a certain extent, compensate for the loss the "Repertorium" sustains; as he is acquainted with the French, Italian, English, Danish, Swedish, and Dutch languages; and his journal, in addition to the original work it published in German, gave notices of the most important contributions to veterinary science which appeared in these countries.

THE "MAGAZIN FÜR DIE GESAMMTE THIERHEILKUNDE."—This journal, which, under the editorship of Gurlt and Hertwig, was in existence for forty years, ceased to appear at the end of 1874. It was one of the best and most interesting of the continental veterinary journals, and conferred great benefits on comparative pathology and the advancement of our science in Germany. It was the representative Prussian organ, and appeared bi-monthly in Berlin. Though it has disappeared, Germany will not sustain any loss in the number of its veterinary periodicals (and they are now rather numerous), Gerlach, Müller, and Schütz having undertaken the task of editing a new journal, or rather a continuation of the "Magazine;" for these authorities state that it will only be new in its title and editorship, as, in order to leave to Gurlt and Hertwig all the honour to which they are entitled through their management of that serial, the journal which is published in 1875 will be designated the "Archiv für wissenschaftliche und praktische Thierheilkunde." There can be little doubt that the three editors, whose names now appear in connection with it, will maintain its high standard of excellence.

THE SOCIETY OF ARTS.—The Society of Arts has awarded its medal to Mr. Fleming, of the Royal Engineers, for his paper on "Horse-shoes and Horse-shoeing," read at the Society's meeting held on May 5th.

NUMBER OF DOGS IN BADEN IN 1873.—The total number of dogs in Baden, for which a license was paid in 1873, was 33,784. The human population was, in the same year, 1,460,000 souls; so that we have one dog to every forty-three inhabitants. The sexes of the canine species were in the following proportion: males, 22,566; females, 10,571.—*Thierarztl. Mittheilungen*, § 215, 1873.

THE WEATHER AND CATTLE DISEASES IN AUSTRALIA.—The central portions of the continent of Australia appear, by the accounts given in the *Melbourne Argus*, to have suffered severely from drought. In Victoria the country inside the coast ranges was parched up, no rain of importance having fallen for months. Slight showers had visited the eastern and southern coast districts at intervals of a few days, but the south-western districts were as dry as the interior, and the live stock were beginning to suffer from want of water, as well as from shortness of feed. On some of the early lambing stations, fears were entertained that it would be necessary, as in former similar emergencies, to destroy the lambs as they were born, in order to save the ewes. No drought so severe had occurred, it is stated, for fourteen years. In the meantime, however, the health of the live stock, except as regards pleuro-pneumonia among cattle, is represented as being satisfactory. The foot-and-mouth disease has not been heard of in the colony since the "stamping-out" process was applied to a few cases which arose owing to the importation of a diseased beast about three years ago. The enactments prohibiting the importation of cattle and sheep have so far served to keep Australasia free from both Aphtha and Rinderpest. The time over which the original prohibition extended having expired, it has been necessary to issue a proclamation extending the provision still further. This course has been taken by the Governments of Queensland, New South Wales, Victoria, and South Australasia. This extension of the prohibition is viewed with disapproval by some of the stockowners, who are desirous of importing pure-bred cattle from England, and steps have been taken in New South Wales to influence the Government towards a reversal of the adopted policy.

FRENCH ACADEMY OF SCIENCES.—One of the two Montyon prizes has just been awarded to MM. Arloing and Tripier, of the Lyons Veterinary school, for their experimental researches on the conditions of persistence and sensibility in the peripheral end of divided nerves. At the annual public *séance* held on the 28th December last, M. Mégnin, Veterinary Surgeon in the Artillery, received the Thore prize, given to the author of the "best memoir on the cellular cryptogams of Europe (fluviatile or marine algæ, mosses, lichens, or fungi), or on the habits and anatomy of a species of the insects of Europe." Mégnin's memoir was on the *Acaridæ*, and is spoken of in very high terms by the Commission, which was composed of Milne-Edwards, Decaisne, Duchartre, Brogniart, and Blanchard.

NUMBER OF VETERINARY SURGEONS AND VETERINARY FARRIERS IN BELGIUM IN 1875.—The veterinary surgeons registered in Belgium for the present year number 411. Of these, 34 belong to the army: 1 inspector, 12 veterinary surgeons of the first class, 12 of the second class, and 9 of the third class. The civil veterinary surgeons are located in the nine provinces in the following numbers:—

In the Provinces of						
Antwerp	...	19,	of whom	13	are Government	Veterinary Surgeons.
Brabant	...	73	"	32	"	" "
Western Flanders	...	37	"	28	"	" "
Eastern "	...	41	"	29	"	" "
Hainaut	...	87	"	44	"	" "
Liege	...	52	"	28	"	" "
Limbourg	...	17	"	14	"	" "
Luxembourg	...	18	"	15	"	" "
Namur	...	33	"	21	"	" "

There are also 127 veterinary farriers (farriers who have studied at the National Veterinary School, and received a certificate of competency) distributed over these provinces.

TEST OF DRINKING WATER.—The quality of water in relation to its fauna and flora has been the subject of investigation by some of the French Academicians. In substance, the results seem to prove that water in which animals and plants of higher organization will thrive is fit to drink; and, on the other hand, water in which only the infusoria and lower cryptogams will grow is unhealthy. If the water become stagnant and impure, aquatic plants of the higher order will languish and disappear, and the half-suffocated fish will rise near the surface, and crowd together in parts where there may be a little of the purer element trickling in, and if driven from these places they will soon die. *Physa fontinalis* will only live in very pure water; *Valvata piscinalis* in clear water; *Limnæa ovata* and *stagnalis*, and *Planorbis marginatus*, in ordinary water; and, finally, *Cyclascornea* and *Bithynia impura* in water of middling quality; but no mollusc will live in corrupt water. Plants also exercise a reactive influence on the quality of water. The most delicate appears to be the common watercress, the presence of which indicates excellent quality. Veronicas and the floating water-weeds flourish only in water of good quality. The water-plantain, mints, loosestrife, sedges, rushes, water-lilies, and many others, grow perfectly well in water of moderately good quality. Some of the sedges and the arrow-heads will thrive in water of very poor quality. The most hardy or least exacting in this respect is the common reed, or *Phragmites communis.*

FISH IN THE KENTUCKY MAMMOTH CAVE.—Among many important papers in the *Proceedings of the Boston Natural History Society*, vol. xviii., we find in Part II. an account of fishes and cray fish collected by Mr. F. W. Putnam in the Mammoth Cave, Kentucky, while acting as ichthyologist to the State Survey. The species were, *Amblyopsis, spelaeus, Typhlichthys subterraneus, Chologaster Agassizii, Cambarus pellucidus* and *Cambarus Bartonii.* The two first, commonly known as big and little blind fishes, are without external eyes and colourless; *Chologaster* has eyes, and is of a beautiful brownish tint. *Cambarus pellucidus* is blind, but *C. Bartonii* has dark eyes, and is generally found in the cave of the same mottled brown as individuals living in the Green River.

In a cave on the opposite side of the Green River several miles below the Mammoth Cave, blind fishes and crayfish were found so near the entrance, that artificial light was not required to see them. *Chologaster*, unlike the other blind fishes, which are surface swimmers, seldom leaves the bottom of the stream. Mr. Putnam said, "he had carefully seined the Green River and its tributaries without finding a *Chologaster* out of the cave," from which he concluded "that darkness did not bring about atrophy of the eyes, if the specimens were any test; for here we had fishes with eyes which had (for all we knew to the contrary) been in the cave as long as those species without them, and were an essentially subterranean form, as far as our present knowledge goes." It may be said, on the other hand, that in the absence of information how long these *Chologasters* had been in the cave, we have no right to assume that continued deprivation of light does not lead to atrophy of the visual organs.

A NEW MODE OF TREATING COWS WHOSE MILK DOES NOT YIELD BUTTER.—In the reports of the Government Veterinary Surgeons of Brabant, Belgium, we observe that M. Deschrynmaekers mentions a mode of treating cattle whose milk does not yield butter, and which he asserts has never failed. He prepares the following compound: Sulphate of soda, 300 grammes; oak bark, 12 grammes. This is divided into three doses, and to each dose is added half a litre of vinegar and salt water. A dose is given in the morning fasting. It is never necessary to repeat the treatment.

Obituary.

WE have to record the death, on June 16th, of Mr. J. H. Langworthy, Veterinary Surgeon to the Queen, at the age of seventy-five years. Mr. Langworthy obtained his diploma in 1824, and succeeded the late Mr. Goodwin as Veterinary Surgeon in the Royal Household. He had been a Vice-President and Member of Council of the Royal College of Veterinary Surgeons.

We have also to record the death of Mr. William Cope, of Newark, Notts, whose diploma bears date April 29th, 1861; Mr. John Marsdin, of Doncaster, who received his diploma on May 3rd, 1860; and Mr. George James Richards, of Littleport, Ely, whose diploma is dated April 18th, 1872.

Of the Continental Veterinarians of distinction whose demise is worthy of note, we mention with deep regret that of Professor and Imperial Councillor Jessen, of the Dorpat Veterinary School. Jessen was widely known by his many valuable contributions to Veterinary medicine, and perhaps more particularly by his long, zealous, and unchangeable advocacy of protective inoculation for Cattle-plague in the Russian dominions. Veterinary science loses in him one of its most talented and devoted adherents. He continued his labours up to within a few days of his death, which occurred somewhat suddenly. He was seventy-five years of age.

Correspondence, etc.

HÆMATOMA AURIS.

To the Editor of the VETERINARY JOURNAL.

SIR,—What is popularly called "External Canker" of the dog's ear, referred to in your first number under the above heading, is a disease the pathology of which is not very evident. Its treatment, also, is not very definite. I quite agree with your editorial note to Professor Trinchera's case, as to its origin in the dog being always traumatic, and I suspect that its comparative frequency in insane people is due simply to the rough usage of the attendants. I do not think, however, that the condition should be described as Hæmatoma. It assumes the form of a tumour, and the contents are doubtless sanguineous, but I look upon it simply as an injury to the perichondrium, followed by exudation of blood, serum, etc.

In practice, we find that merely lancing this swelling permits of the escape of some fluid, that the wound soon heals, and that the tumour rapidly reforms. If we lay it open freely, we find, or rather, I should say, I have always found, not only fluid, but a clot of blood within it. Believing that the non-removal of this clot is really the cause of the refilling of the tumour, I have adopted the practice of freely opening it, and removing the clot. I then touch the edges of the wound with nitrate of silver, and have not yet met with an unsuccessful case.

A net cap for the ears is a useful auxiliary, especially if the cause of the dog's shaking his head is a diseased condition of the external meatus. If there is no complication, the shaking will cease when the pain of the incision has passed off; but even in this case the cap facilitates a cure. I object, however, to caps made of thick material, which keep the parts hot, and act too much like a poultice.

Your obedient servant,
W. H

ANTHRAX AND ITS TRANSMISSIBILITY.

To the Editor of the VETERINARY JOURNAL.

WALPOLE, MASSACHUSETS, U.S., *June 18th*, 1875.

DEAR SIR,—I cannot refrain from expressing to you the very great satisfaction and pleasure I have derived from the perusal of your exhaustive article in the second vol. of "Veterinary Sanitary Science and Police," on Anthrax and Anthracoid Diseases.

Until your work appeared, I had sought in vain for any treatise on the sanitary measures to be adopted.

At the commencement of my experience, the experiments of Davaine were unknown to me; but from my knowledge of the disinfecting powers of heat, I was led to advise the boiling of the hair before submitting it to any of the processes of manufacture. I am happy to state that when this was thoroughly done, no cases of "Charbon" occurred; but either because it increased the expense of manufacture, or from some other cause, this plan was given up, and then new cases of this disease were observed.

I have not had any cases since I met with Davaine's experiments, published in *Comptes Rendus de L'Acad. des Sciences*, Sept. et Oct., 1873; but I confess I shall be anxious to try the effects of heat locally, if an opportunity occurs.

I have not been able to conduct any experiments in inoculating the virus into the lower animals myself, though some made for me by a most careful and competent physician, Dr. Nichols (author of the article on this subject in the Annual Report of the State Board of Health of Massachusetts for 1871), failed to communicate the disease to rabbits or guinea-pigs from man.

I send you by this mail the results of my own experience with the disease up to 1870, being a paper prepared at the request of the Massachusetts Medical Society, and read at their annual meeting. I am well aware that it contributes nothing new, and can only stand for additional observations of this disease.

Believe me, with respect,

Your very obedient servant,

S. E. STONE.

DISEASES IN AMERICA.

PROFESSOR J. LAW, of the Cornell University, Ithaca, United States, sends us a letter, a portion of which, having reference to some diseases which are seen in America, as well as in this country, is interesting to the comparative pathologist. He writes: "Your elaborate work on Veterinary Sanitary Science and Police has just reached me, and from a cursory review I judge it to be a work of which the English veterinary profession may well be proud. Some remarks on our American zymotics, however, deserve correction, and especially those on Texan Fever and Milk-sickness. There is no reason to suppose the former to be caused by travel, but solely by the malaria of certain parts of the Gulf States. There is every reason, I think, to separate it and Hog Cholera from Anthrax affections. The true nature of Milk-sickness remains to be proved, but there is no good ground for supposing that it is caused by any particular plant. I strongly approve your position in regard to Strangles, Influenza, and Contagious Foot-rot (of Sheep). The latter can be studied here without the disturbing element of Aphthous Fever, and its contagious properties are easily demonstrable."

Communications, Letters, Books, etc., Received.

COMMUNICATIONS have been received from T. Paton, Army Service Corps, Dublin; J. W. Hill, Wolverhampton; W. H. London; W. H., Coates, London; Professor J. Law, Cornell University, United States; D. S. E. Stone, Walpole, Massachusets, United States; Hippochirurgus; W. Varley, Royal Engineers, Aldershot; W. Field, junr., London.

BOOKS, ETC.: *F. Saint-Cyr*, Traité d'Obstetrique Vétérinaire; *A. Petermann*, La Co position Moyenne des Principales Plantes Cultivées. The *Scotsman*.

All Communications, Books for Review, Advertisements, etc., must be addressed to the Publishers, 20, King William Street, Strand, W.C.

Morbid Specimens are to be forwarded addressed to the Editor, "Veterinary Journal," Brown Institution, Wandsworth Road, London.

Communications must be accompanied by the name of the writer, whether he may desire to have it published or not. Anonymous letters and articles cannot be inserted. The Editor does not hold himself identified with the views or opinions expressed by Contributors. Communications for insertion in the next number must arrive on or before the 15th of the present month.

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C. J. HEWLETT & SON,

WHOLESALE AND EXPORT

VETERINARY DRUGGISTS,

ESTABLISHED 1832.

SPECIALITIES.

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ÆTHER, METHYLATED
BINIODIDE OF MERCURY
HEWLETT'S SPECIAL BLISTER OINTMENT
CANTHARIDES
EPSOM SALTS, COLORED
EXT. BELLADONA
GENUINE POWDERS
MASSES
MUSTARD
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POTASS. IODIDI
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SPS. ÆTHER NIT.
SOLUTION of ALOES, Barb.
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PATENT COATED HORSE BALLS

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